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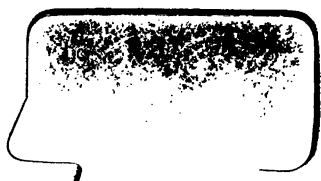
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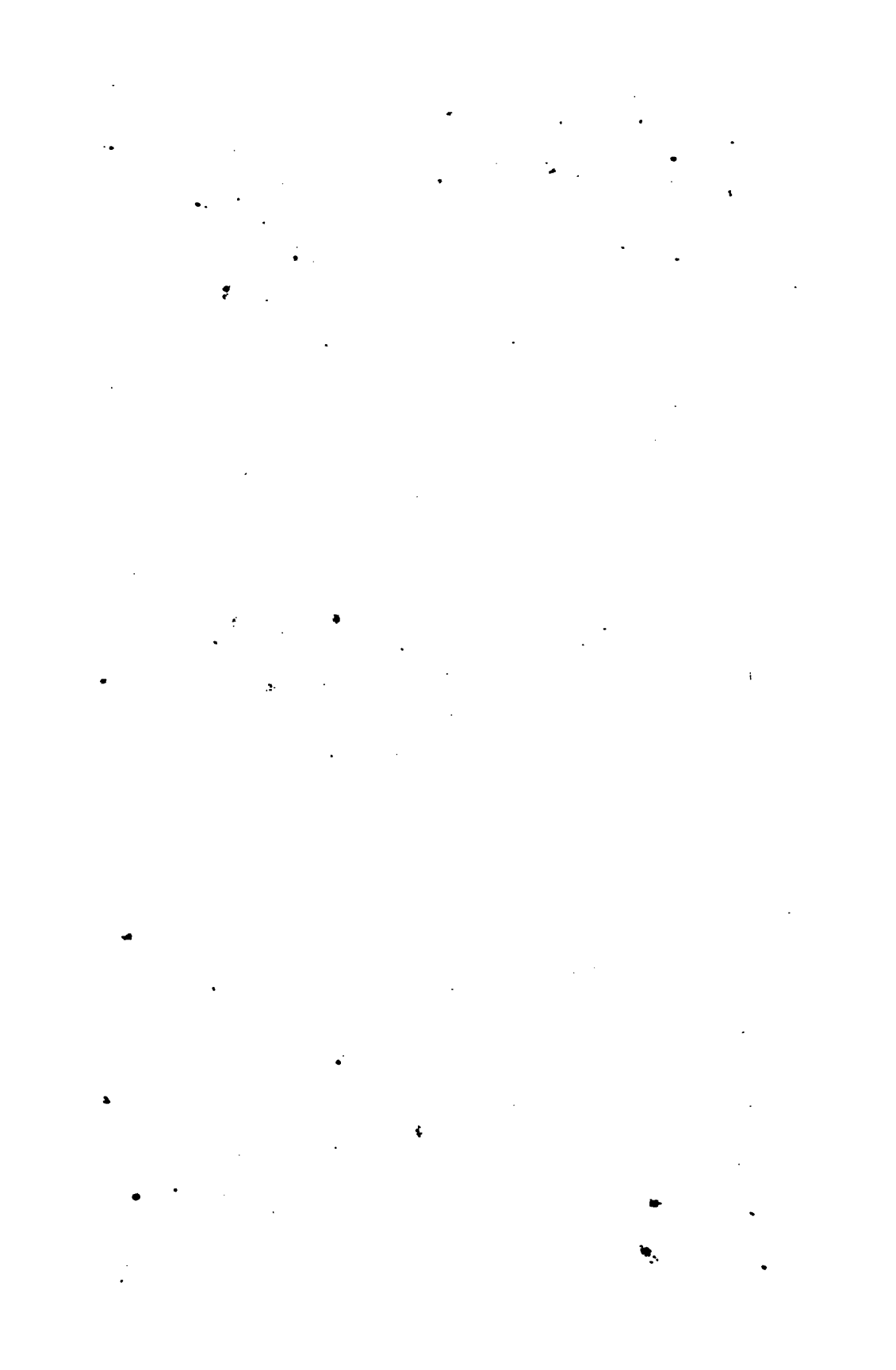
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# THE BATH THERMAL WATERS;

HISTORICAL,  
SOCIAL, AND MEDICAL.

BY

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WITH AN

APPENDIX ON THE CLIMATE OF BATH,

BY THE REV. L. BLOMEFIELD, M.A., F.L.S., F.G.S.

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SPARGIT AQUIS ADITUS: ET AQUÆ MEDICAMEN HABEBANT.—*Ovid.*

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LONDON: J. & A. CHURCHILL, NEW BURLINGTON ST.  
BATH: WILLIAM LEWIS & SON, "The Herald" Office.

—  
1882.







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**THE  
BATH THERMAL WATERS.**

and in the medical part of the subject I thought it would be interesting to let contemporary records speak for themselves; and in every case in which it has been possible I have referred to the original works of the many authors that are quoted. But some books and pamphlets enumerated by the Rev. Richard Warner, in his "History of Bath," are not now accessible to the ordinary reader, and a few are probably very scarce.

By the kindness of my accomplished friend, the Rev. L. Blomefield, I am permitted to republish a large portion of a paper on the "Climate of Bath," written by him nearly a year and a half ago. The subject of Climate has been too little examined. Careful observations require to be continued for many years, and even then cautious deductions must be made. And when every physical and tangible character has been noted down, and everything that can be expressed by instruments has been recorded, there still remain qualities not easy to

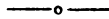
## PREFACE.

define, and which affect different persons in different ways. Unusual misapprehension has existed on some points connected with the climate of Bath, and we owe much in this matter both to Mr. Blomefield and to the punctual labours of Mr. Russell, Librarian of the Bath Royal Literary and Scientific Institution.

J. K. S.

*Bath; March, 1877.*

## PREFACE TO THE CHEAP EDITION.



The issue of a cheap edition offers me an opportunity of thanking the public for the favourable way in which this work has been received. Nor do I less thank the critics, nearly all of whom have been kind to me, and some have given valuable suggestions.

I venture to repeat that I have not attempted to sketch in these pages the general social life of Bath during the last three centuries. This has been related a hundred times before, and a hundred times better than I could tell it. My literary effort concerns the history of Bath only so far as it

touches the Thermal Waters ; the medical importance of the "Bath Waters" seems to grow day by day, and they well deserve all the scientific enquiry that can be bestowed upon them.

J. K. S.

*Bath ; January, 1882.*





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## CORRIGENDA.

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Page 56, line 14, for "impress" read "impresses."

Page 263, line 1, for "Seborrhæa" read "Seborrhoea."

# THE BATH THERMAL WATERS.

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## CHAPTER I.

### INTRODUCTORY.

A few years ago Dr. Beneke, of Marberg, published some criticisms on English bathing places, and said that his English colleagues had done less in this matter than most practitioners at the German, Dutch, and Belgian health-resorts. "Climatology and Balneology in England," added Dr. Beneke, "are in a state of greater stagnation than almost any other department of Medical science." A recent English writer, Dr. Macpherson, confirms these shortcomings, and blames the profession generally for not taking more interest in these questions. He complains that the chemistry of

British Mineral Waters is neglected, and that "bath physicians" are very sparing in communicating accounts of their practice. Regular courses of lectures on bathing and climate are delivered in German and French medical schools ; and a knowledge of these subjects is considered a necessary part of the equipment of an accomplished physician.

More than thirty-five years ago Dr. Granville, in his "Invalid and Visitor's Hand-book to the Hot Springs of Bath," speaks of his professional brethren as having nearly forgotten that such a Mineral Water is in existence. He tells us his anxious wish to see Bath attain its due and high station as a spa ; for, "of all Christian cities, Rome excepted, whose ancient edifices and recollections have no parallel, Bath presents the most striking amphitheatrical spectacle which a traveller can behold, as he approaches it for the first time." About the middle of the last century Dr. Sutherland said that in no branch of the healing art was observation so deficient as in the application of Mineral Waters. "Bath is the Baïæ of the world," exclaimed he, "but every bath in Europe disgraces ours ;" and the doctor delineates with a melancholy pen what Bath was in the Roman days. He reminds us that among the ancients Thermology was a rational scientific doctrine. The Romans prepared baths

for recreation, cleanliness, and health ; imperial pride was in no instance so conspicuous as in the stately structure of baths ; almost all the emperors raised sumptuous baths, which bore the names of their respective founders ; baths were erected in every Roman province. For six hundred years Rome knew hardly any other medical aid than that of baths and a few empirical nostrums ; by the rational use of baths the ancients prevented and cured diseases ; baths were *munera Divum*, the theme of poets and historians, and the sacred care of the Republic.

With the decline and fall of the Roman Empire it is not too much to say that a scientific knowledge of natural baths was temporarily lost. The forgotten art was restored by Baccius, who in 1622 wrote a famous treatise, *De Thermis*. In this *Principia* of a wide subject the world is rebuked for its negligence and ignorance of the art of bathing. We are reminded that baths were applied to medical use by Hippocrates ; that they were formerly reckoned among the cardinal remedies ; and that Mineral Waters had been appointed by Providence for the cure of the various ailments of mankind. To what was then a new study Baccius brought a truly philosophic spirit ; but he was carried away by his enthusiasm when he declared that bathing, properly applied, exceeds the power



of any other medicine. Other early writers speak of baths as physic for every disease. Did not Medea persuade the daughters of Pelias to cut their father to pieces and boil him, in order to bring back to him life and vigour? and did not Minerva give Hercules a bath as a reward for his many toils? Many medical hydrologists still cling to the antiquated theory that each Mineral Water is endowed with occult and specific virtues, which render it suitable to certain distinct maladies. More inductive methods of investigation lead others to such extreme scepticism that they are unwilling to admit anything of which they cannot explain the reason, and especially the chemical reason. "In the hands of some men," says Dr. Sutherland, "Mineral Waters are remedies divine, in the hands of others they are edge tools." Thermal Medicine is a matter of appreciation and tact. A Mineral Water has no other value than that which a skilful physician knows how to elicit from it. To consider it as a medicament prepared and supplied by Nature for a single special object is a grave error. Mineral Waters are composite instruments in the hands of the physician, and from them it is his duty to obtain the most advantageous results.

Medicated Waters being thus the workmanship of Nature, how are we to learn their virtues? Solely by their effects. With simple truth Dr.

Sutherland says that as no one doubts the power of opium to quell pain and the power of bark to cure intermittents, so no one can doubt the efficacy of some Mineral Waters to make cripples take up their beds and walk. Hypothetic reasonings are always precarious in a matter which can be determined only by experience and observation. It was long since written by Dr. Peirce that a useful knowledge of a Mineral Water is sooner and better had *à posteriori* than *à priori*, and he quotes the illustrious Boyle to the same purport. "But here," says Mr. Boyle, "I must ingeniously own to you that, notwithstanding the many ways I propose of discovering the natures and qualities of Mineral Waters, I think the surest way of knowing them is a long and sufficient experience of their good and bad effects. . . . When I consider that the ingredients (of Mineral Waters) may be numberless, and the qualities resulting from the commixture may be very different from those of the separate ingredients, I am apt to look upon the difficulty of securely determining the effects of Mineral Waters *à priori* as little, if at all, less than insuperable to human understandings." In judging the therapeutic action of a Spa it is a mistake merely to take into account the principal constituents of the Water, and thence to infer their action by their known medical effects. A Mineral Water is a complex medicine, having a

peculiar mixture and a specific temperature. Let it be administered to healthy persons, so that we may discover its physiological action ; but whatever that action may seem to be, nothing forbids us to prescribe a Mineral Water when experience has taught us that it ought to be beneficial. Success or failure—let both be honestly declared ; that as “the one may supply the place of a landmark, the other may do the office of a buoy.” We lightly esteem the gifts of Nature because they are so common. While we puzzle our brains about butterflies, writes an old Bath doctor, we know but little of the properties of Water. Water is the universal medicine !

Empires rise and set, and in like manner Spas bloom and fade. The fluctuations of a Thermal Water—its fashionable ebb and flow—are among the curiosities of local history. The records of every county in England tell the story of wells famous in their day, recommended by doctors and patronized by nobles, the very sites of some of which have perished from memory. Sometimes a mineral spring has been diverted from its course by a mine or a railway ; sometimes it has become polluted by the drainage of a town or a manufactory ; and now and then it has been extinguished by the operation of natural causes. A writer in the latter part of the seventeenth century says that at that

time there was scarcely a county in England which had not a medicinal Water, frequented more or less at some season of the year. The fame of some had even then utterly departed. Mention is made of a Water at Wellingborough, in Northamptonshire, then (1693) scarcely known ; and to-day (1876) we have lost the recollection of the chalybeate springs of Astrope, near Oxford, and of Seend, near Melksham, both of which were formerly reputed to be as strong as the Tunbridge Water itself. Southward, at Awford (now Anford), near Castle Cary, there was a spring said to be not inferior in medicinal properties to that of Epsom ; it was sold publicly, and sent in bottles to Exeter, Plymouth, and the Land's End. This spring seems to have rivalled for a time the renown of the Bath Thermal Waters. Coming nearer home, a spring at Holt was commemorated in a little volume, published in 1731, entitled "A Brief Account of the Holt Waters, containing 112 eminent cures, performed by the use of the famous Mineral Waters at Holt, near Bath, in Wiltshire, being faithfully collected by the sworn purveyor to her Majesty for all Mineral Waters." A Spa at Melksham became suddenly celebrated at the end of the last century ; grand houses were built, and persons of "quality" flocked there. On Dr. Granville's map (1838) are placed the sites of 300 springs in Germany,

all of which have been frequented within historical memory by invalids, who have found in them a successful termination of their sufferings. Such are the waves of fashion and fancy, which have so affected our own Thermal Waters that they have sometimes sunk almost into oblivion, neglected and disparaged even by those who are their natural guardians. A future page will pourtray the migrations and caprices of sick people, and how their movements are determined by the unconscious revolutions of time, and by the discovery of rival resorts of health and amusement. The curiosity and inquiry on this subject at the beginning of this century may be learnt from an interesting "Treatise on the Chemical History and Medical Powers of some of the most celebrated Mineral Waters," published by Dr. William Saunders in 1805.

But if the world in general be credulous and easily satisfied, so that thousands of invalids are always rushing about in the hope of finding that relief which they fail to receive from medical skill at home, it is a fact that doctors have often had a reasonable scepticism on the theory of Mineral Waters. This scepticism has been partly the effect of ignorance: for Dr. Granville says that in his day, neither by travel nor by acquaintance with foreign writers, did medical men know anything

about foreign Spas. A truer eclecticism opens the door for wider therapeutic knowledge, and welcomes therapeutic aid in every form. Those very salts which we are, perhaps, prescribing for a patient day by day, are disseminated through that universal "element" water by the hand of Nature, with a chemistry far more cunning than ours; and assisted by a caloric which we cannot imitate. Not a single natural agent has been placed within our reach which does not possess some property calculated to benefit us. The vegetable and mineral world abounds with healing treasures. Observe the diffusion through the universe of natural waters, bubbling or boiling out of the earth, charged with many of the principles which belong to the mineral world, and not a few which belong to the vegetable world also. Are these waters, asks Dr. Granville, likely to have been bidden to flow for nothing? Look, says the Doctor, at their regularity, at their permanence in quantity and quality, and how they are endowed with a resisting and unconquerable power against all disturbing causes, when everything else seems to change. Then why have some eminent men doubted the utility of Mineral Waters in general, and the Bath Thermal Springs in particular? Simply because the poison of charlatanny has sown suspicion and distrust, which have obscured the truth precisely when there was most need to

discover it. Anything gets the odour of quackery when it becomes the object of unqualified eulogy or sordid gain, and when it is made the instrument of private interests rather than of public good. It was pertinently said by Sir George Gibbes, who practised here as a physician some sixty or seventy years ago, that eagerness in recommending a medicine is often the surest means of destroying confidence in it; and the great number of different ends which the Bath Waters are said to accomplish cause them to be undervalued. The Bath Waters, he continues, have been extolled for too many virtues; although a patient investigation of their real powers would have enhanced their properties much more than such indiscriminate praise. Other authors have derided in no polite terms the unmeasured pretensions of some "bath-doctors," who have spoken and written as if they possessed a panacea for all mortal troubles.\* And so we may understand the puzzled frame of mind in which Dr. Heberden, an eminent scholar and philosopher, wrote on a subject not much understood in his day. "The difficulty," he says, "of ascertaining the powers of medicines, and of

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\* It was remarked by Dr. Barlow—who is still remembered with high regard by a few surviving friends in Bath—that a treatise on a Mineral Water by a physician practising at its source is sometimes unfairly regarded as an endeavour to entice visitors by exaggerated representations of medicinal efficacy.

distinguishing their real effects from the changes wrought in the body by other causes, must have been felt by every physician ; and no aphorism of Hippocrates holds truer to this day than that in which he laments the length of time necessary to establish medical truths ; and the danger, unless the utmost caution be used, of our being misled even by experience. This observation is fully verified in the uncertainty, under which we still remain, in regard to the virtues of the Waters of Bath. Few medicines have been more repeatedly tried under the inspection of such numerous and able judges ; and yet we have had in the present age a dispute between those who, by their experience and sagacity, were best qualified to decide this question, in which one side asserted that paralytic patients were cured, and the other that they were killed by the use of these Waters. Such contrary decisions, so disreputable to physicians, and so perplexing to the sick, could never have happened after so long a trial if a very small part of those whose practice had afforded them frequent opportunities of observing the effects of Bath Waters, had told the public what in their judgment was to be hoped or feared from them." It will be agreeable to know that, after all deductions had been made, Dr. Heberden considered the Thermal Springs of Bath as among the most valuable natural Waters which our island possesses.



The people of Bath may now rest and give thanks that after so many oscillations and seeming accidents, the nature and utility of their Thermal Waters rest upon a scientific basis which is not likely to be overthrown. It is the purpose of this volume to describe and exemplify the physiology and therapeusis of our healing fountains, to relate their history, tell their social importance, and examine their capabilities of helping rational Medicine ; and I shall try to make the subject as interesting as I can. My faith in dry technical treatises is very small. As a monument of industry, or as a museum of research, a book of this kind may have its merits and may be even quoted by learned men. What its ultimate fate will probably be can be learnt from the recollections of a work of "infinite deserts," published in 1832 by the late Dr. Gairdner, of Edinburgh, on the Mineral and Thermal springs of the world. The copies presented to the Library of the Royal Society were found with leaves uncut in 1837 ! The failure arose from addressing scientific pundits without thinking of general readers : but even the profession has no love for Dryasdust. As a matter of fact, every Spa has its auxiliaries of change of air, a new mode of life, rest of body and mind, and sundry little amusements and gaities. All of these are, more or less, "adjuvants" to the

benefit which is expected from the use of the mineral spring ; and he who writes about the latter ought not to forget the reflex influences of the former. It is logically impossible to separate these factors and to declare exactly how much is done by each. Nature embellishes, and Art improves, and Bath is much indebted to both. They who hold in trust such health-giving fountains as ours have a splendid gift, with corresponding duties and obligations ; but the laudatory epithet "King of Spas" (Dr. Granville) will not cleave to us a day longer than the title can be justified by medical observation and scientific scrutiny. No exaggeration, no gilding, no flattery, will make a thing worth what it is not, or confer more than an ephemeral distinction on agents of trivial value. Mineral Waters operate neither by magic nor by charm, but by their chemical and organic powers, and always in harmony with the laws of the general Institutes of Medicine.

## CHAPTER II.

THE BATH THERMAL WATERS : THEIR PHYSICAL  
AND CHEMICAL PROPERTIES.

The design of this volume obliges me to collect my material from a variety of sources. The history of the Bath Thermal Waters includes divers particulars, on all of which much valuable and authentic matter has been written. In re-writing the history of any institution or thing it is clear that so far as old facts have to be told again originality is impossible, but the old facts may be related in new methods or grouped in new ways. Different annalists describe different events, which have to be critically sifted and weighed ; and now and then facts have to be rescued from obscurity and almost oblivion. To execute my purpose in any worthy manner it has been necessary to consult many books, old and new, some of these being so scarce as to be met with only in a few public and private libraries, and to be classed among the "curiosities of literature." To know some of this buried lore, is it not a mark of municipal loyalty ?

The most meritorious antiquarianism is that which concerns the beneficent things bestowed on the world for the health of Man, and the steps by which a knowledge of the utility of those things has been acquired. Here are benign pools placed in the midst of us, flowing "without tides" at our very feet, and having a genealogy beyond all historic record. Quite a dramatic story is woven around this city of the "warm vale," and a literature has been created of which no community need be ashamed. It has been an agreeable duty to investigate traditions and legends, to unravel chemical speculations, and to study many tributes of wonder and gratitude; and now the work remains to arrange these memorials in order and form, and to trace the historic stages (so to speak) by which the medicated Waters of Bath have reached their present usefulness and renown.

The Bath Thermal Water is a clear and almost colourless fluid. When freshly drawn it may show a momentary sparkle, and then remains perfectly quiet without sending forth any bubbles or giving any sign of effervescence. In bulk (as seen in the open baths) its tint varies somewhat with atmospheric conditions, appearing sometimes light sea-green, and at other times pale blue. There is no odour from a glass of the fresh Water; but from any large body of the Water a slight pungency

strikes the nose ; but this is never unpleasant or sulphurous. Water hot from the pump has a strong chalybeate impression on the tongue, and a faintly saline taste. Directly the Water cools the chalybeate impression is entirely lost, and nothing but the slightest saline sensation is left, scarcely distinguishable from common hard spring water. On standing in the open-air for some hours the Thermal Water becomes somewhat turbid by the separation of a pale ochrey-yellow precipitate, which gradually subsides. The Water remains slightly turbid and of a whey colour after the "ochre" is precipitated, but does not deposit any other substance in any ascertainable quantity. Gas rises through the body of Water in the baths in large clusters of bubbles, which may be readily collected in an inverted bottle held over the surface of the Water. Dr. Priestley, in his "Experiments and Observations on Air" (1755), announced that this gas consists of only one-twentieth of its bulk of fixed air, or carbonic acid gas, and the remainder is almost entirely nitrogen.\*

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\* In a delightful volume on Greece, originally published in 1840, Bishop Christopher Wordsworth (of Lincoln) speaks of the hot springs which gave a name to Thermopylæ, and which are connected with the history both of Hercules and Leonidas. These springs still flow from the earth, and expand their streams into pools of the *clearest blue*, as they did in the ages of the demigod and of the King.

The temperature of the Bath Waters is their most important phenomenon. Telluric heat is a subject of intense interest, and is always a leading feature in estimating the power of a Mineral Water. The Rycum and the New Geyser in Iceland throw up water quite boiling. Brongniart quotes the mineral spring at Vic as actually boiling ; and the wells of Piscarelli, near Naples, and of Albano, in Lombardy, are within 12 and 31 degrees respectively of the boiling point. The temperature of the Sprudel at Carlsbad is about 165 degrees (Fahr.). Other Continental baths (as those of Wiesbaden, Baden-Baden, and Aix-la-Chapelle) have temperatures of a rather lower range. Writers slightly differ as to the exact heat of our own springs, but they are quoted by a recent authority as follows :\* —The Hot bath is 120 degrees, the King's bath is 117 degrees, the Kingston (or Old Roman) bath is 108 degrees, and the Cross bath is 104 degrees. The poverty of the British Islands in the supply of Thermal Water is shown by the fact that the next warmest spring is at Buxton, the temperature of which is only 82 degrees. The Waters of Warmbrum, Pfeffers, and Wildbad approach in temperature those of Bath, being as nearly as possible 98 degrees.

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\* Dr. R. W. Falconer, in "The Baths and Mineral Waters of Bath," 1860.

The cause of the heat of thermal springs is still a perplexity to philosophers,\* nor do the most advanced geological speculations afford a perfect solution of the problem. Our ancestors were satisfied with the simple dogma that the Bath Waters were produced by the "all-powerful wit of the royal necromancer," King Blaedud. The origin of their heat and theory of their constitution, according to the popular belief devoutly held six centuries ago, are given in some curious doggerel, quoted in the "Historical and Poetical Medley," or Muses' Library, 1738. The meaning of that quaint jargon is briefly this :—King Blaedud buried deeply in the earth at Bath two tuns of burning brass, and two formed of glass, the latter of which contained seven species of salt, brimstone and wildfire ; and these, being placed over the four springs, occasioned (by the fermentation of their contents) that great heat which had continued for so many ages, and would last for ever.† A poet of the thirteenth century, Alexander Nechan, embodied another vulgar opinion that a certain place of brimstone (*locum sulphureum*) below made the Bath Waters

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\* It is remarkable that this subject received no attention in "The History of the Inductive Sciences," by the late Dr. Whewell.

† In the Rhyming History of Unfortunate Princes, composed

hot.\* Coming at once to less remote times, we find the vaguest conjectures discussed in a serious (now and then pseudo-serious) way. Among the earliest of a long series of Bath medical worthies, Dr.

---

by John Boccace (*circa* 1450), and translated by Daniel Lidgate, Blaedud speaks thus :—

Some say, I made the Holesome Baths at Bath,  
And made, therefore, two burning tuns of Brass ;  
And other twain seven kinds of Salts, that have  
In them enclosed ; but these be made of glass ;  
With sulphur filled, wildfire emixt there was.  
And in four wells those tuns so placéd Heat, for aye  
The Water springeth up before it pass away.

Our own local historian, the Rev. Richard Warner, humorously says that “a mixture so truly infernal as the above would not have many advocates for taking them [the Waters] internally.”

\* A few verses of Nechan's may be quoted :—

Bathoniaë Thermis vix præfero Virgilianas,  
Confectò prosunt Balnea nostra Seni :  
Prosunt attritis, collisis, invalidisque ;  
Et quorum morbis frigida Causa subest.  
Prævenit humanum stabilis Natura laborem,  
Servit Naturæ legibus Artis opus.  
Igne suo succensa quibus data Balnea fervent  
Ænea subter Aquas vasa latere pulant :  
Errorem figmenta solent inducere passim,  
Sed quid ? Sulphureum novimus esse locum.

I have not room for a long and interesting quotation from Drayton's *Polyolbion*, 3rd song, in which the bard gives his philosophy of the hot springs of Bath. Warner quotes Selden's commentary on Drayton's verses.



Guidott thought that metals and minerals contained in the earth, acted on by various springs, generate heat by ebullition and fermentation. Dr. Jorden favoured the doctrine of fermentation, supposing an acid spring to be running upon the alkali of freestone and snailshells ; the acid being the father, and the alkali the mother, of the fermentative process. Dr. Peirce argued that the heat arose from a spring of water passing through mineral substances, and delivered his views in the following way :—"Two channels are, in the bowels of the earth, differently impregnated with the streams, vapours, or substances of different salts or mineral juices ; these channels thus meeting, and being (as before supposed) differently impregnated, fall a fermenting together, and

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Done into English by Dr. Guidott :—

Bath's Baines with Virgil's I compare,  
Useful for ancient folk they are ;  
Bruis'd, weak, consum'd, as well as old,  
And in all griefs whose source is cold.  
Nature Man's labour doth prevent,  
And Art again serves her intent.  
There's Fire under ground, some say,  
That thus makes Bath's great pots to play.  
Fancy doth often Error breed,  
But what ? from Brimstone these proceed.

*(The Sulphur Theory was the favourite one in mediæval times, and was adopted by Dr. Venner, in 1637.)*

acting one upon another, produce this actual heat, and so deliver the Waters up warm at the spring head. Several liquors are known which are cold when asunder and become hot when mixed. Mr. Boyle is recorded as mixing two limpid liquors, quite cold, and their becoming presently so hot as to heat the glass considerably, even so far as to affright one of the timorous sex.\* Dr. Oliver supported the same view, and showed the unlikelihood of any actual fire, for the equality and evenness of the heat of the Waters must have a more steady cause than any fire can be.† Dr. Lucas speaks of the “pyrite” as the cause of the heat ; and Dr. Charleton, though

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\* The chemical student of the non-timorous sex is at first astonished, though not “affrighted,” by the prodigious heat evolved by mixing water with sulphuric acid.

† Other arguments against volcanic agency were adduced by writers of the same epoch, and were put in the following form :— A fire would not burn so long underground and not break out anywhere, as burning mountains do. Fire cannot exist without having “spiracula,” or vents through which it may discharge its flame and smoke, and others through which the air may be admitted, to afford it fresh pabulum or to fan and agitate it. No noises are heard in the bowels of the earth, and there are no earthquakes. If subterranean fires were the cause of the heat of the Bath Waters, the combustible matter would mix with them and foul them. Whereas, by the peculiar cookery of nature, the Waters are not only of a very agreeable and delicious taste, but also of a fine, clear, crystal colour.

he talks in a rhapsodical way of "elementary fire," allows the probability of the caloric of the Bath Waters being caused by common spring water running through beds of pyrites (iron and brimstone),\* and this doctrine was advocated by Dr. W. Falconer. It is curious that Dr. Wilkinson, a man of much sagacity, returned to the old notion of the "central fire," and this so lately as 1811. Mr. Spry (1822) reviewed the arguments on the question, and summed up in favour of the slow decomposition of mineral strata as the essential factor of Thermal Waters.

The subject has been carefully discussed by the late Professor Daubeny, in his Treatise on Volcanos. He removes from the class of "thermal" all those springs whose temperature exceeds by only a few degrees that of the atmosphere ; and, after taking a survey of the various localities in which hot springs occur, he points out that a very large proportion of them arise from rocks which in their general aspect and structure attest the operation of volcanic forces at one period or at another. There is scarcely any volcanic district known in which hot

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\* Dr. Charleton quotes Mayow :—*Circa thermas æstuentes ita statuendum esse arbitror, videlicet, particulas ærias unà cum aquis pluvialibus in altam tellurem descendentes ibidemque mineræ salino-sulphuriæ occurrentes, æstum, caloremque admodum intensum in eâdem excitare.*

springs do not abound ; indeed, almost every volcanic region has its own system of Thermal Waters associated with it. Secondly, there are Thermal Waters situated in the midst of volcanos which are considered as extinct, that is, which have given no indications of activity since the country was first inhabited. In these cases it can hardly be doubted that the cause of the temperature of the springs is intimately connected with the volcanic operations which have at one time occurred, or which may be now taking place in a more suppressed form somewhere in the neighbourhood. But, thirdly, there are a very large proportion of Thermal Waters which appear to lie quite remote from volcanos either active or extinct ; and hence it becomes necessary to enquire what the situations may be in which these are principally found. Now, it so happens that a great number are met with either at the foot or else in the very midst of some elevated chain of mountains, and it has been shown by Professor Forbes and others that in the majority of cases the springs have gushed out at or near the line of junction between the granite or other igneous products and the stratified rock resting upon its flanks, which from its highly inclined position would seem to have been upheaved ; while in a few cases where the springs occur in the midst of the granite itself patches of stratified rock are found con-

tiguous. Thus, the same agent which forced up the granite through the axis of the chain, may have given rise to the hot springs which accompany it just along the line of disruption.\*

In one point I anticipated just now the account which will be given presently of the chemical constitution of the Bath Thermal Waters, because the evolution of gas from them is not due to any adventitious cause, but is essentially connected with the very existence of the heat which characterises them. And this inference, says Professor Daubeny, is confirmed by the peculiar nature of the gases which are here brought to the surface. If the gas emitted be derived from atmospheric air, the latter must have parted with four-fifths of its oxygen before it reached the surface of the earth ; and this has been discovered to be common to all natural springs whose temperature presents a marked excess over that of the locality in which they are formed. But in no known instance does the absolute quantity of nitrogen emitted at all approximate to what is observed in the case of the Bath Waters.

Now, it is remarkable that this same gas is constantly sent forth from volcanos in their active as well as in their dormant condition.

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\* "A Description of Active and Extinct Volcanos" (1848), pp. 539-545.

This has been asserted not only by Professor Daubeny, but by Bunsen and by M. St. Claire Deville. Instances are cited at Vesuvius; the extinct volcanos of the Solfatara and of the Lago d'Agnano; among the Lipari islands; and in springs at the base of Mount Etna. Hence it is inferred that the evolution of nitrogen gas, wholly or partially deprived of the normal proportion of oxygen accompanying it in the atmosphere, is essentially connected with the igneous action which is going on in the interior of the earth, and that it is met with in Thermal Waters only because the latter derive their heat from the same chemical operations which give rise to the phenomena of volcanos. What is the theory of this noteworthy fact?

Only one explanation seems at all adequate, replies Professor Daubeny. We fall back upon the simple hypothesis which assumes that some process of oxidation is going on near the place in which the phenomenon manifests itself, such as should bring about an absorption of the oxygen present both in the air and in the water which penetrate to these depths. The phenomena resemble those which would occur if water and air were alternately brought into contact with metallic bases possessing a strong affinity for oxygen. The consequence of such substances being in each other's proximity would be

primarily an evolution of large volumes of hydrogen from the water and of nitrogen from the air, these being the residues of the two compounds after oxygen had been abstracted from both by the chemical action exerted.\*

It has been further observed that the evolution of nitrogen from the earth in a state of purity, or intermixed with only a small amount of oxygen and carbonic acid, seems to imply some process of combustion by which oxygen has been abstracted from common air which found its way to the interior of the earth ; for, if the nitrogen had arisen from the decomposition of organic matter (as some have thought) it ought to be accompanied by carburetted hydrogen. Moreover, no amount of organic matter could produce such a constant supply of nitrogen as exists in the Thermal Waters of Bath. Another explanation of its origin is suggested by Professor Rogers, who imagines that the absorption of oxygen by large masses of iron or of carbonaceous matter may cause the emission of nearly pure nitrogen. But it has been objected that such a process can hardly be going on in a sufficiently extensive way to cause a phenomenon which seems scarcely ever absent where Thermal Waters exist.

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\* Memoir on the Thermal Waters of Bath, communicated to the Chemical Section of the British Association, held at Bath, under the presidentship of Sir Charles Lyell, in 1864.

It is impossible to do justice to the ample literature of this subject,\* but Goethe's whim of galvanic action must not be passed over. Mr. Charles Moore advocates the high probability of progressive chemical changes being the *vera causa* of the temperature of hot springs; but the Rev. H. H. Winwood believes that the cause is to be sought in the subterranean heat of the interior, as the fissure through which the Waters ascend seems to be in the palæozoic rocks. Mr. Moore points out, however, the difficulty of the apparent non-diminution of the decomposing material; and this is really wonderful, considering how long the Bath Waters have been invariable in heat and quantity. Without metaphor, this hot fluid is a message from the very deeps, telling us of the structure of things beyond the reach of all hypothesis and all knowledge. What has been flowing and bubbling for so many ages will go on *ad sæcula*; and we realize the ancient epigram that the least stable phenomena of Nature are yet sometimes the most permanent. "What continual and inexhaustible treasures are stored up here in the bowels of the earth," says old Dr. Guidott. "Dame Luna, with her nepes and spring tides, hath no influence

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\* Boué is the distinguished French authority, and Professor James Forbes has done good work in the same direction.



at all here ; these waters all along have been and are *Aquæ Solis*, for Sol is solely predominant here, and Lord Paramount." In a like poetic vein Dr. Oliver discoursed of hot Mineral Waters as possessing a soul and a body. " The soul which warms, enlivens, and keeps all their component parts in a due motion and mixture is fire, that most active (so far as we know) of all material beings. As soon as the Waters are exposed to the open air, this æthèrial substance breaks through its watery prison, and wings its way towards its kindred element. When this *spiritus rector* has taken its flight, the remaining mass becomes cold and lifeless. The *spiritus rector* seems to act by re-animating weak, cold, flabby animal fibres, and reviving cold, viscid, rapid animal fluids, by uniting with them and rendering them again warm, spirituous, and active. When the solid contents of the Waters are no longer under the influence of the *spiritus rector*, they still retain, during some weeks at least, qualities not unuseful to the animal economy ; though far inferior to those virtues which the Waters possess when drunk as quickly as possible from the spring head."

It was remarked nearly two centuries ago that the cause of heat of the Bath Waters could not be far away from the baths themselves ; for, on digging many wells and quarries and pits about the city, no hot water ever appeared, except in a stone quarry

near Dunkerton, described by Dr. Jones (in 1572) to have been so hot that the workmen were "fain to forbear working." Thermal Water is said to retain its heat longer than ordinary water heated to the same temperature ; but the experiment has been repeated by several observers with varying results. All the older writers asserted that Bath Water, when cool, loses its volatile principle and its efficacy.

In giving an account of the chemical constitution of the Bath Thermal Waters, I must not omit the interesting antiquarian part of the story. In pre-chemical days much scientific ground was covered by very few metallic and non-metallic bodies : and thus it came to pass that some of these bodies stood as symbols of everything that is inflammable, others of what is styptic and chalybeate, and a third class represented things that are muddy or clay-like. The art of quantitative analysis did not exist ; and even as regards quality there was immense vagueness of statement, and much conjecture about the unknown. Among the earliest formal accounts of the composition of the Bath Waters, our veteran author Dr. Jones (in his "Bath of Bathe's Ayde," 1572,) writes that sulphur and copper and iron are certain constituents of the same. Dr. Jorden (1630-1688) believed in bitumen, sulphur and nitre.\* In

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\* This substance is not what we call nitre or saltpetre, but is *natron*, and is closely allied to the ordinary washing soda and to

1670, Dr. Mayow controverted current theories of the existence of nitre and sulphur ; but it was Dr. Guidott who chiefly decried his predecessors, although he arrived at substantially the same conclusion. He evaporated five gallons of the Water, obtained one ounce of residuum, and made out the following proportion of solid contents :—Of grit, 5 parts ; salt, 3 parts ; marle, 2 parts ; common salt, more than 2 ; and nitre, 1 part. One spring contains more grit, and another more saline particles. Tincture of galls tinges the Waters of all the springs when hot ; but if suffered to stand until cold the colour is not altered. Dr. Baynard (1722) ventured on no analysis, but supposed that the Waters contained sulphur, iron, nitre, and a salt *sui generis* in small quantity. In 1725, Dr. Wynter (author of *Cyclus Metasyncriticus*) compared the Waters of Bath and Bristol, and was of opinion that the former contained steel and sulphur. Dr. Lucas' doctrine was against bitumen, sulphur, nitre, and fixed alkali ; whereupon Dr. Sutherland tried to

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carbonate of soda. It occurs abundantly in some lakes of Egypt. It is mentioned in Proverbs xxv. 20, "As vinegar upon nitre, so is he that singeth songs to a heavy heart ;" and in the Book of Jeremiah ii. 22, "Though thou wash thee with nitre, and take thee much sope, yet thine iniquity is marked before Me." It is a question whether "nitre" was ever found at the Dead Sea.

prove the existence of sulphur, in opposition to Dr. Lucas. Dr. Sutherland pronounced the chief constituents of the Bath Waters to be hot elementary fluid, air, spirit, iron, sulphur, and salt. Dr. Charleton (1770) analyzed 34 grains of residuum from a quart of Thermal Water, and found iron, earth, common sea salt, a neutral salt, elementary fire, and sulphureous matter. Sulphur is said to mean all unctuous bodies in general; so that "if any such can be discovered in these springs, it has all just right to be called their sulphureous principle, how much soever it may differ from common brimstone." The sulphureous principle is said to be an "exceeding fine aromatic balsam, entirely dissimilar from common brimstone." Dr. W. Falconer enumerated the ingredients as saline bodies, inflammable bodies (*hepar sulphuris cum calce vivâ*), metallic bodies, earthy bodies, and aerial bodies. And in 1788, Dr. Wilson, in three letters to his friend Dr. Harington, entitled "Conjectural Ideas on the Nature and Qualities of the Bath Waters," maintained that the active properties were due to an inflammable gas, termed "hepatic air, the progeny of sulphur."

Quitting now the region of fable for a land whereon we may tread with a firmer foot, we meet our accomplished friend, Dr. Wilkinson, who in 1811 published a tabular analysis of the Bath

Waters. A gross residuum of 400 grains was said to be composed as follows:—

|  | Grains. |
|--|---------|
| Sulphate of lime ... ..  | 231     |
| Muriate of soda ... ..   | 84      |
| Sulphate of soda ... ..  | 45      |
| Carbonate of lime... ..  | 22      |
| Oxy-carbonate of iron ... ..   | 5.6     |
| Silex ("dark sand, pyritical and siliceous"), with a variable quantity of vegetable extract. | 5       |

The brown substance floating on the baths, supposed in old times to be sulphureous, is really of vegetable origin. The air evolved at the spring Dr. Wilkinson made out to consist of 94 parts of nitrogen, 2 of oxygen, and 2 of carbonic acid.

The following is Mr. Phillips' analysis:—

|                          | Grains. |
|--------------------------|---------|
| Sulphate of lime ... ..  | 9.3     |
| Carbonate of soda ... .. | 3.4     |
| Sulphate of soda ... ..  | 1.4     |
| Carbonate of lime ... .. | .8      |
| Silica ... ..            | .2      |
| Oxide of iron ... ..     | .01985  |
| Error ... ..             | .11985  |

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The gaseous contents were described as consisting

in 100 parts of 5 of carbonic acid, and 95 of nitrogen.

Dr. Scudamore's analysis was given in 1820 :—

|                     |     |     |     | Grains. |
|---------------------|-----|-----|-----|---------|
| Muriate of lime     | ... | ... | ... | 1.2     |
| Muriate of magnesia | ... | ... | ... | 1.6     |
| Sulphate of lime    | ... | ... | ... | 9.5     |
| Sulphate of soda    | ... | ... | ... | .9      |
| Silica              | ... | ... | ... | .2      |
| Oxide of iron       | ... | ... | ... | .01985  |

Passing over all intermediate and more or less unstable ground, I am allowed to quote Captain Mackay Heriot's recent researches into the composition of the mineral springs of Bath, as they are related in the "Proceedings of the Bath Natural History and Antiquarian Field Club," 1875. The paper was read on March 18th, 1874. To this Club, as well as to the Bath Literary and Philosophic Association, we are indebted for many papers of interest to the antiquarian and the citizen. Soon after the revival of the Association in 1856, there was a discussion on the cause of the heat of the Bath Waters.

# ANALYSIS OF THE BATH MINERAL WATERS, FEBRUARY, 1874

| Constituent Parts.                       | ROMAN BATHS.            |                    | KING'S BATHS.           |                    | HETTLING PUMP           |                    | CROSS BATHS.            |                    |
|--|-------------------------|--------------------|-------------------------|--------------------|-------------------------|--------------------|-------------------------|--------------------|
|  | Parts per Million.      | Grains per Gallon. | Parts per Million.      | Grains per Gallon. | Parts per Million.      | Grains per Gallon. | Parts per Million.      | Grains per Gallon. |
| Calcium                                  | 367                     | 25.69              | 377                     | 26.36              | 401                     | 28.07              | 388                     | 27.16              |
| Magnesium                                | 43.8                    | 3.06               | 47.4                    | 3.31               | 52.2                    | 3.65               | 46.8                    | 3.27               |
| Potassium                                | 37                      | 2.59               | 39.5                    | 2.76               | 31                      | 2.17               | 37.5                    | 2.62               |
| Sodium                                   | 125                     | 8.75               | 129                     | 9.03               | 137                     | 9.59               | 140                     | 9.80               |
| Lithium                                  | .67                     | .046               | Traces.                 | Traces.            | Traces.                 | Traces.            | Traces.                 | Traces.            |
| Iron                                     | 5.9                     | .413               | 6.1                     | .427               | 6.7                     | .469               | 4.5                     | .315               |
| Sulphuric Acid                           | 840                     | 58.8               | 869                     | 60.83              | 884                     | 61.88              | 895                     | 62.65              |
| Carbonic Acid<br>(combined) }            | 87                      | 6.09               | 86                      | 6.02               | 89                      | 6.23               | 83.5                    | 5.84               |
| Chlorine                                 | 262                     | 18.34              | 280                     | 19.60              | 275                     | 19.25              | 280                     | 19.60              |
| Si.O2                                    | 29                      | 2.03               | 30                      | 2.10               | 36                      | 2.52               | 38                      | 2.66               |
| Sr.                                      | Traces.                 | Traces.            | Traces.                 | Traces.            | Traces.                 | Traces.            | Traces.                 | Traces.            |
| Alkaline Sulphides                       | Traces.                 | Traces.            | Traces.                 | Traces.            | Traces.                 | Traces.            | Traces.                 | Traces.            |
| Carbonic Acid Gas<br>at normal temper- } | Cubic centi-<br>metres. | Cubic<br>Inches.   | Cubic centi-<br>metres. | Cubic<br>Inches.   | Cubic centi-<br>metres. | Cubic<br>Inches.   | Cubic centi-<br>metres. | Cubic<br>Inches.   |
| ature & pressure }                       | 65.3                    | 19.05              | 62.2                    | 18.2               | 80.4                    | 23.4               | 51.5                    | 14.9               |
| Solid Residue                            | 1920                    | 134.4              | 1920                    | 134.4              | 1950                    | 136.5              | 136.5                   | 137.9              |
| Temperature at Source }                  | 39½                     | Centig.-103°       | 41¼                     | Centig.-106½°      | 46                      | Centig.-115°       | 41                      | Centig.-105½°      |
| where water was taken }                  |                         | Fahrt.             |                         | Fahrt.             |                         | Fahrt.             |                         | Fahrt.             |
| Specific gravity                         | ...                     | 1.0015             | 1.0015                  | 1.0015             | 1.0020                  | 1.0020             | 1.0020                  | 1.0020             |

The Water for Analysis was taken from the nearest accessible source to the spring, except that from the King's Bath, which was taken from the drinking fountain in the Grand Pump Room.

MACKEY HERIOT, *Captain Royal Marine Light Infantry.*

Captain Heriot observes that there are four mineral springs supplying the following baths:— (*a*), the Roman bath ; (*b*), the Hetling bath ; (*c*), the Cross bath ; and (*d*), the King's bath. These springs, though probably from the same source in the earth, are not connected by artificial means.

“The Water for analysis was taken from the nearest accessible source to the spring, with the exception of that from the King's bath, which was taken from the drinking fountain in the large Pump Room, and for this reason : so many persons came there to drink of the Waters that I thought it of more consequence to let them know what they were drinking than that the bathers should know in what they were bathing. Not that there would be much difference in the result of the analysis. The Waters of the large bathing place where the spring is would naturally be stronger in earthy constituents and iron, from the fact of there being more free carbonic acid gas in them ; the Water in passing thence by pipes to the fountain would probably lose a portion of this acid, and then down go the iron, lime, and magnesia. This accounts for the red ochreish deposit which we notice on the drinking fountain.

“The amount of iron in the Water at the drinking fountain of the King's bath is not by any means constant ; it varies as much as 20 or 25 per cent., and at times no doubt very much more



“A pipe from the source of the spring communicates with the drinking fountain, and the engine which pumps the Water up this pipe also fills the tank in rear of the baths. Now, when the engine is not at work the fountain is supplied from this tank, and the consequence follows that the Water being exposed loses its carbonic acid gas, which causes a proportionate quantity of the iron to be deposited, and will account for the variation noticed. On the other hand, when the supply comes direct from the spring a change in the taste of the Water will be remarked, and the greater amount of iron may then be detected.”

Captain Heriot says that many “Bath people have an idea that their Mineral Waters are without change ;” but an illustration drawn from the chlorine contained in them will show the daily variation of the Waters. The amount of chlorine contained in each spring was estimated by Captain Heriot day by day for the week ending February 21st, 1874, and the following tabular statement gives the result.

#### BATH MINERAL WATERS, 1874.

Table showing the daily variation of chlorine in the Waters for the week ending February 21st (expressed in parts per million).

| Bath    | Feb. 16 | Feb. 17 | Feb. 18 | Feb. 19 | Feb. 20 | Feb. 21 |
|---------|---------|---------|---------|---------|---------|---------|
| Hetling | 278     | 279     | 277     | 278     | 278     | 278     |
| King's  | 277     | 280     | 278     | 284     | 277     | 280     |
| Roman   | 264     | 270     | 264     | 266     | 266     | 270     |

It will be observed that the lowest figure shown is 264 for the Roman baths on the 16th of February, while the highest is 284 for the King's bath on the 19th of February, giving a variation of 20 parts per million.

The result of the analysis shows that the Waters of the different springs come undoubtedly from the same source in the earth. "We may justly suppose that the spring travels in an easterly direction, from the fact that the Waters give their greatest strength at the Hetling and Cross baths, while at the other two baths they appear to lose somewhat of their solid contents."

I do not understand the entire omission of nitrogen in Captain Heriot's table. The importance of this gas from a qualitative point of view has been dwelt upon, and Professor Daubeny noticed its variation from time to time in a manner not easily accountable. Upon an average it appears to amount to not less than 222 cubic feet daily from the King's bath alone; and from the Thermal Waters of the place taken collectively probably to not less than 250 cubic feet. Bubbles of nitrogen issue from the warm spring at Buxton, and from one

or two other slightly Thermal Waters in the same county, as at Bakewell and Stony Middleton. The emission of gaseous bubbles from a hot spring is turned into poetic use by Sophocles, in the drama of the *Trachiniæ*. Such at least is the explanation given by Dr. Clarke of the passage in which Deianira describes the poison given her by the Centaur Nissus, with which she had anointed the tunic prepared for her husband Hercules. Some of the wool which had imbibed this poison being thrown down on the spot where the hot springs now appear, it is said that frothy bubbles rose from the earth.\*

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\* ἐκ δὲ γῆς, δόιν

Προὔκειτ', ἀναζίζουσι θρομβώδεις ἀφροί,  
Γλαυκῆς δαπύρας ὅστις πίονος ποτοῦ  
Χυθείντος εἰς γῆν Βακχίας ἀπ' ἀμώϊλου.

vv. 701-704.

“And from the earth where it had lain, there oozed  
Thick clots of foam, as when in vintage bright  
Rich must is poured upon the earth from vine  
Sacred to Bacchus.”

*Rev. E. H. Plumptre's translation.*

In “Fragmentary Papers on Science and other Subjects,” by the late Sir Henry Holland, there are the following remarks about nitrogen (p. 337) :—“We know few chemical objects better fitted to stimulate and reward research. Considered in its simplest state as a gas, it is chiefly defined by negative qualities; while in its compounds it furnishes some of the most violent agents, explosive and poisonous, which Nature or Art has pro-

Carbonic acid is an important constituent, as it greatly contributes to the solubility of certain salts, and renders them more agreeable and more palatable to the stomach. The amount (either free or bound to certain bases) depends upon hydrostatic and atmospheric pressure, and the degree of temperature. The gas is loosely bound to some, and firmly impregnated in other, Mineral Waters.

The earth through which Mineral Water issues and which it pervades, may be used to surround the body, and is called a mud-bath. It is unknown in this country, and only of recent introduction into Germany. The use of mud-baths is of great antiquity, as Galen speaks of Egyptian mud for anointing different parts of the body. At S. Amand and Abano such baths are the only ones used.\* "The angel who went down at a certain season into the pool to trouble the water," before the sick could enter it, is evidently figurative of the periodical or occasional

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duced. . . . The natural relations of this element to animal life, both in its structure and functions, are matter of high interest. Nor must we omit those recent discoveries which give to nitrogen a cosmical existence in planetary space, together with hydrogen and the several metals which have yielded their lines to the spectrum."

\* For further information about the nature and uses of mud or moor baths, see Braun's Treatise on the "Curative Effects of Baths and Waters," translated by Dr. Weber.

muddy condition of the pool of Bethesda, at which time experience had probably shown that the water was in the best state for medicinal and sanative purposes. Among curiosities in Balneology may be mentioned the sand-bath ("Arenation"), the body being buried in sand and exposed to the sun. Baccius recommended rolling in sand, dust, salt, and toasted wheat. Gout can be cured, according to Pliny, by covering the affected part with dry wheat. Herb-baths were not uncommon in the middle ages.

The natural exhalations of the Bath Waters continually impregnate the atmosphere of Bath, and may somewhat modify its climate.

The continuous flux of mineral springs impress us with the enormous disintegrating powers going on in the interior of the earth. The Sprudel Spring at Carlsbad gives forth daily 12,008,000,000 pints avoirdupois of hot water. As there are 31 grains of salts of soda in every pint, besides other solid ingredients, we have mineralizing agents of acknowledged virtue thrown out of the earth to the amount of 376,250,000,000 grains daily by that spring alone. All this solid material is washed out of the inside of the globe, and is either deposited on the outside or is carried by streams and large rivers out to sea.\*

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\* Mr. Bonney quotes instances to show how large a mass of matter can be discharged from a volcano. For example, in less

In a few centuries vast changes may thus be silently brought about, the nature and extent of which we can hardly realize. By a successive process of emptying and deposition the saline constituents of the earth change places, water being the vehicle of this and all similar metamorphoses. The quality of a soil, the kind and degree of vegetation, and even certain conditions of atmosphere (as humidity and the like) may be determined in some measure by the volume and course of mineral springs. Commerce has been created, and obscure districts of country have become famous by the dowry of medicinal Waters; roads and railways have been made for carrying the sick, the infirm, and the aged; villages have become towns, and towns have grown to cities. Potentates and ministers have interested themselves in the welfare of a Spa, and it might be even an object of diplomacy and politics to acquire a territory in which Nature has hoarded one of her healing treasures.

The account which has been given of the physical and chemical philosophy of the Bath Thermal Waters is by no means an exhaustive one. It is only lately that the traces of lithium and strontium were found;

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than a week, in the year 1538, Monte Nuovo, a hill in the bay of Naples, nearly 450 feet high and about a mile and a half round at the base, was thrown up. (Manual of Elementary Geology, p. 38).

and there is a possibility of other elements, metallic or non-metallic, being discovered. There is besides a something in every mineral Water which is beyond precise definition ; for if the same materials be put together in a laboratory according to identical weight and measure, we do not get at all the same vital product. Nature will not be mimicked so easily. We imagine that we have successfully copied her, but our counterfeits are proved to be coarse and ineffectual. "There are natural compositions contrived for the benefit of mankind," wrote Dr. Oliver (1719), "which exceed all the mixtures and compounds man can invent." Mineral Waters, again, are a protest against any theory of medicine which pretends that only the most simple means are required to cure disease, and that only infinitesimal particles of medicated substances are admitted by Nature to promote recovery. And, lastly, from an economic view it is a positive duty to make the most of what is so freely bestowed upon us, and with all the appliances of experiment and research to explore some of the hidden problems of therapeutic chemistry.

## CHAPTER III.

SOME ACCOUNT OF THE BATHS OF BATH :  
HISTORICAL AND SOCIAL.

In the days of the ancient Britons, Bath was dignified with the name of *Caer Bren*, from *Caer*, a City, and *Bren*, a King; the King's City. The Britons gave it also the name of *Caer Palladur*, *Pallas' City*; and *Caer Baden*, the City of Baths.

The Romans called it *Aquæ Solis*, *Aquæ Calidæ*, *Thermæ*, and *Balnea*.

The Saxons called it *Bathancester*, City of Baths; *Hat Bathan*, Hot Baths;\* *Ackmanchester*, the City of Oak men, or Invalids; and the City of Ached and Lame People. Also the "City of Oyntment," from the diseased people that came here for relief; and the "City of the Warm Vale," or

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\* Prebendary Earle considers that the present name, Bath, arose from the simple elision of the prefix and affix of "*Hat Bathan*;" and, according to the same writer, the "Ack" in *Ackmanchester* represents *Aquæ*, and "man" means place.



Minerva's Water. Bath was the "metropolitan seat of the British Druids."

Our story begins with the antique and orthodox legend of King Blaedud. Blaedud, eldest son to Lud Hudibras (then King of Britain), returned from Athens—the Oxford of those days—and was a leper. He was consequently sequestered from everyone. He chose rather a mean liberty than a royal restraint, and escaped in disguise. He wandered into parts remote from his father's court, and was employed even in menial ways ; then he was entertained in service at Swanswick, where his business was to take care of pigs, which he was to drive about for food. Driving them one day down Beechen Cliff (on which Dr. Peirce says that in his time—1697—there was scarcely a beech tree left), he observed some of the herd in very cold weather go down from the side of the hill into an Aldermore, and thence to return covered with black mud. Observing further, he perceived a steam and smoke to arise from the place where the swine wallowed. He made his way to it and found it to be warm, and so he was convinced that the pigs resorted to it for the benefit of the heat ; further, he noticed that any of his herd which had diseased skins became whole and smooth after wallowing in the mud. So he considered within himself whether he might not receive the same

benefit by the same means ; whereupon he tried and was cured of his leprosy. He returned to court with a clean skin, and was at first hardly received ; at length he was owned and adopted. At his father's death Blaedud succeeded to the government, built the city, and made the baths.

We may say, with Dr. Peirce, that the legend is "every jot as likely as that Charles the Great should find the baths at Aix-la-Chapelle by the tread of his horse when he was hunting." But formerly such credit was given to the tradition by the natives of Bath that almost everyone received it for truth, celebrated it in their songs, and instructed their children in it. Nevertheless, soon after the restoration of Charles II., the zeal for Blaedud began to cease ; for the famous John, Earl of Rochester, coming to Bath, Blaedud and the pigs became a subject of his wit, and so the story was struck out of the inscription placed against one of the walls of the King's bath. Dr. Peirce relates further that soon afterwards Owen Powell (mentioned in the *Spectator*, Nos. 14, 31 and 40) having introduced the British prince upon his stage in Bath, and everything reported of him becoming matter for that little Æsop's ridicule, it made the "aboriginal inhabitants" extremely cautious of repeating afterwards what had been so solemnly handed down to them ; so the tradition is now (*i.e.*

Dr. Peirce's time) in a manner lost at Bath. Entirely lost, however, the tradition will never be. It is enshrined in popular affection, and seems not repugnant to the popular understanding; and it helps to give a habitation and a name to what is otherwise hopelessly in the dark. If the tradition be rejected we must support ourselves with the consolatory philosophy of Dr. Guidott, who warns us that this must suffice for the antiquity of the Waters, namely, that "they were discovered eight hundred and odd years before Christ; that not long after Christ undoubted mention is made of them in credible authors, and that doubtless they were known and made use of long before any author wrote of them. Therefore, to trace their original is to unravel the Creation, and to make enquiry for their commencement little different than to seek after the head of the Nile."\*

The first of King Blaedud's works was to erect

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\* In the "Rhyming History of Unfortunate Princes," referred to on a previous page, there is another stanza which may be aptly quoted here. King Blaedud says:—

"I must confess, by learned skill I found  
 These Nature Wells, whence springs that help for Men.  
 But well thou know'st, there runs from underground  
 Springs sweet, salt, cold and hot, even now as then,  
 From Rock, Saltpetre, Alum, Gravel, Fen;  
 From Sulphur, Iron, Lead, Gold, Silver, Brass and Tin—  
 Each Fountain takes the force of Vein it coucheth in."

proper cisterns about the heads of the hot springs, to receive the Water upon its breaking out of the earth ; over which cisterns we may suppose high towers to have been built, not only to render the situation of the hot springs conspicuous to people at a distance, but to serve as objects of adoration. The cisterns that originally received the Water of the hot springs seem to have been only two in number, one at the head of the chief spring, and one between two smaller springs.

In Roman times the fame of these baths was such that the very ways leading to them were by the Malmutine Laws made places of sanctuary. The military road called Ackmanstreet, or Oakmanstreet, led from Buckinghamshire through Oxfordshire to the Fosse, and thence on to Bath. Bath was the residence of a consular army for more than ten years. There is no extant written evidence of the Bath Thermal Waters until the time of the Romans, and Solinus (*circa* A.D. 81 or 83) was the first author who notices them.\* The

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\* Dean Merivale, in his "History of the Romans under the Empire," says that the building of cities, the cultivation of the land, the construction of roads and the erection of pleasure-houses, had converted the lair of Cæsar's painted savages into an Italian garden. "Already the warm and mineral springs had been discovered which still draw our health-seekers to Bath and Clifton, to Cheltenham and Matlock. The tin, copper and silver

Romans had no idea of the use of hot Mineral Springs, except as a luxury and as a remedy for various local disorders. The magnificence and embellishment of the Romans baths will be depicted bye and bye, when I relate how the Kingston or Abbey baths were "unearthed" about the middle of the last century, and what archaic treasures were then disclosed. Bath was always the first city in Roman Britain; and when her masters departed the Thermal baths fell into decay, and finally into utter ruin.

At the dawn of Christianity in England, Archbishop David (*circa* 544) employed himself in turning the works about the hot springs of Bath "from the service of idols to that of the true God." The monks in succeeding ages affirmed that the Archbishop, by his prayers, cured the Waters of their "defection," and gave them perpetual heat and healing virtues. The fact is, says Wood, that

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ores of Devon had been worked with method and perseverance; the iron of Gloucester and Sussex, the lead of Yorkshire, Derbyshire and Salop, the coal of Wales, Staffordshire and Durham, had all been brought into requisition to supply the essential wants of a thriving population, and to pour their supplies into the imperial treasury." Elsewhere Dr. Merivale describes the great *thermae* of the Empire; the baths of Agrippa and how they were amplified and improved by Nero; and the baths of Titus, which were again surpassed by those of Caracalla, Diocletian and Constantine.—See also Gibbon's *Decline and Fall*, chap. xxxi.

the Archbishop cleared the heads of the springs of the rubbish that lay about them, restoring the chief bath, and making new ones to receive the lesser springs. And so the Water had liberty to display its heat and virtue, which it could not do while the springs were buried in the ruins of the city. To St. David we may therefore attribute the separation of the hot Waters that till then were collected in one well and dedicated to the Moon. Each new well (or cistern) had a tower erected in the middle of it ; and these were furnished at the top with crosses as marks of the conversion of the hot Water from Pagan to Christian uses. Those conveniences with which the baths had been so richly accommodated during the ages of Paganism for the service of mankind were left in their ruins, neglected and soon forgotten.

The baths existed before the city, and gave a name to it. For the convenience of sick people small cottages were made at first, which were afterwards improved into fairer buildings. An old writer says, "It is certain that the city was called *Aquæ Calidæ* from the baths."

The Saxon Kings loved Bath,\* and Osric and Offa dwelt here. The city received privileges and

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\* Familiar, possibly (says Mr. Wright, in his "Historic Guide to Bath") with the Waters of Carlsbad and Toplitz in their own country.

the citizens were enriched. Among the good deeds of the warlike Offa may be enumerated the repairs of the baths and the establishment of a *Xenoclochium*, or hospital for the reception of discharged strangers who journeyed to Bath for a trial of the efficacy of its Waters. This entirely disappeared before the 12th century. The remains of the Roman baths were cleansed, fitted up, and thrown open to the public. To Osric Bath is indebted for its earliest religious foundation. Athelstan and Eadgar delighted in the use of its medicinal springs; and indeed almost all the Saxon Kings either spent some years in Bath or embellished it by acts of munificence. One of the baths was appropriated from very early times to the use of royal visitors, and was called the King's bath.\*

After a short historic blank we are introduced, in the reign of William the Red (or William Rufus), to John de Villula, a "foreign adventurer" from Tours. He first practised Medicine, but quitting the profession for holy orders he became Bishop of Wells. He bought the city of the King for 550 marks, and transferred the see from Wells to Bath. He made two new public baths, calling one the Abbot's bath and the other the Prior's bath; both existed for 500 years. All the baths were shortly

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\* The name occurs in records of the beginning of the 13th century.

afterwards invested in the prior and monks, who for many years\* received all the profits arising from them; being at the same time obliged to keep them in such a state of repair that they might always be fit for the use of the royal family when at Bath. In consequence of a neglect of this obligation, a process issued in 1235 to the sheriffs from the Exchequer to levy upon the prior and monks the sum of £13 11s., the expense of restorations of the King's houses and the King's bath.

In 1138, Robert, first Bishop of Bath and Wells, built another hospital for the use of the leproous poor, dedicating it to St. Lazarus, and providing it at the same time with a bath called the Leper's bath, which was filled with Water from the Hot bath. It was his successor, Reginald Fitz-Joceline, who in 1180 founded a third hospital near the Hot and Cross baths, dedicating it to St. John the Baptist, and endowing it with lands and tenements in Bath and its vicinity, and with a tithe of the hay of all his episcopal demesne lands. To these donations Walter the Prior and the monastery of Bath added a tithe of hay of the demesnes of the monastery, with a tithe of all the bread, cheese, and flesh that should be consumed in the same; and for this liberality the monks were rewarded by the Bishop

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\* "Some centuries," says Warner.



by having the institution and its concerns placed under their management and control. In the early part of the 14th century, Walter, Bishop of Bath and Wells, quashed the grant of Reginald Fitz-Joceline, and gave to the hospital in lieu thereof the sum of 100 shillings, to be received annually by the master and brethren from the hands of the Bishop's bailiff. The subsequent history of the hospital is a melancholy one, and reflects the deepest discredit upon the Corporation. At one time when the Mayor of Bath was the master (in the 17th century) for nearly 50 years the income of the charity went into the chest of the Corporation, or was divided among its members; the paupers being discharged, the buildings neglected, and the chapel desecrated by being turned into an alehouse or a post-office. After much litigation the present chapel and hospital were erected between 1714 and 1728, upon the site of the previous buildings erected in Queen Elizabeth's time.\*

Just previous to the Dissolution of Monasteries, the following account of the baths was given by Leland: "There be two springes of whote water in the west-south-west part of the towne, whereoff the bigger is called the Crosse-Bathe, because it hath

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\* Those who remember the old buildings of the Blue Coat School will recognise the likeness between them and the present chapel of St. John's Hospital. The same architect designed both.

a crosse erected in the midle of it. This bathe is much frequented of people diseasid with lepre, pokkes, scabbes, and great aches, and is temperate and pleasant, having a 11 or 12 arches of stone in the sides for men to stonde under yn time of reyne. Many be holp by this bathe from scabbes and aches. The other bathe is a 2 hunderith foote of, and is lesse in cumpace withyn the waulle than the other, having but 7 arches yn the waulle. This is caullid the Hote Bathe ; for at cumming into it, men think that it would scald the flesch at the first, but after that the flesch ys warmid it is more tolerable and pleasaunt. Both these bathes be in the midle of a lite streat, and joine to St. John's Hospitale ; so that it may be thought that Reginald Bishop of Bathe made this Hospitale nere these two commune bathes to socour poore people resorting to them. The Kinges-Bathe is very faire and large, standing almost in the midle of the towne, and at the west end of the Cathedrale Chirch. The area that this bathe is yn is cumpassid with an high stone waulle. The brimmes of this bathe hath a litle walle cumpasing them, and in this waul be a 32 arches for men and women to stand separately in. To this bathe do Gentilmen resort. Ther goeth a sluise out of this bathe, and servid in tymes with water derivid out of it 2 places in Bath priorie usid for bathes : els voide, for in them be no springes. The

colour of the water of the baynes is as it were a depe blew se water, and rikith like a sething potte continually, having sumwhat a sulphureus and sumwhat a pleasant savour. The water that reunith from the 2 smaul bathes goit by a dike into Avon, by west bynethe the bridge. The water that goith from the Kinges-Bath turnith a mille, and after goith into Avon above Bath bridge. In all the 3. Bathes a man may evidently see how the water burbelith up from the springes."\*

The celebrity which the baths once enjoyed had entirely faded away by the middle of the sixteenth century, owing to the confusion occasioned by the change of property which had taken place in consequence of the dissolution of the monastery. It was the ill-fortune of these baths, says Guidott, that were as good if not better than any baths in the world, to lie a long time in obscurity, and not so much as to be mentioned among the baths of Europe by any foreign writer until about 1570, when that excellent person, Sir Edward Carne, sent as ambassador by Queen Elizabeth to Pope Julius the Third and Pope Paul the Fourth, made some relations of them to that "famous writer," Andreas Baccius, then at Rome. Dr. W. Turner, afterwards Dean of Wells, had never heard of the Bath

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\* Quoted in Warner's "History of Bath," pp. 317 and 318.

Waters until after his return from Germany and Italy. When in residence at Wells, he got liberty to stay at Bath ; he then tried the baths a little further, and found that they were a "very excellent treasure, but unworthily esteemed and judged of all men :—namely, of such as have most plenty of other treasure, but not to be compared with this precious gift of God." Dr. Turner condemns the "niggardish illiberality of the rich men of England, who will not bestow one halfpenny for God's sake upon the bettering and amending of them." In 1572, Dr. Jones, a honest Cambro-Briton, published an exceedingly interesting treatise with the title, "Bath of Bathes Ayde ;" but the insignificant state of the city during the reign of Queen Elizabeth was the chief hindrance to the baths being known and used. There was no convenience at all for drinking the Waters, and little or none for bathing. No measures were, in fact, taken to improve the baths or make their accommodation more complete until they were vested in the Corporation of Bath by the charter of Queen Elizabeth, and then the Cross and Hot baths were at once rebuilt.

In this quiet and almost unapparent way a change was accomplished which was little short of a revolution. When the baths of Bath were leased to the Corporation, privileges and powers were conceded to the laity which have never since been revoked,

and indirectly the people have become trustees of public property. In spite of Dean Turner's efforts, the hot Waters of Bath were so little esteemed and known, that a small satirical poet (Thomas Lupton) of that age made sport of persons of fortune going to foreign countries for what they could so easily enjoy at home :—

“How many use to Baths abroad  
Far hence with cost to range,  
Whereby they may their loathsome limbs  
To healthful members change.”

A man of public spirit and enterprise now appeared on the scene—Thomas Bellot, Esquire, one of the executors of Lord Cecil, in the reign of James I. For the benefit of those poor people to whom the Legislature in 1597 had given the free use of the baths of the city, Mr. Bellot bought a piece of the priory land adjoining the south side of the King's bath, and made a new cistern there. It received the overflowing Water of the King's bath, and took the name of the New bath. It continued to bear this name and to be appropriated to the use of the poor until 1615, when both its name and its services were changed. The story has been often told and with various embellishments, but Wood and Warner shall relate it once more :—“As Anne, Queen of James I., was bathing in the King's bath, there arose from the bottom of the cistern, just by the side of

her Majesty, a flame of fire like a candle, which had no sooner ascended to the top of the Water than it spread itself upon the surface into a large circle of light, and then became extinct. This so frightened the Queen, that notwithstanding the physicians assured her the light proceeded from a natural cause, yet she would bathe no more in the King's bath, but betook herself to the New bath, where there were no springs to cause the like phenomena ; and from thence the cistern was called the Queen's bath. It was soon enlarged, and the citizens erecting a tower or cross in the middle of it, in honour of the Queen, finished it at the top with the figure of the crown of England over a globe, on which was written in letters of gold—*Annæ Reginae Sacrum.*”\*

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\* I may take this opportunity of enumerating the illustrations in Collinson's and Warner's works. In the former is a plate containing a “ View of the cross in the center of the Cross bath as it was originally erected in the year 1688.” “ The forme of the King's bath.” “ The forme of the New bath.” “ The forme of the Hot bath,” by the side of which is figured the Lazour's bath ; in the former persons are represented bathing. “ The forme of the Cross bath.” In the “ Ancient plan of the City of Bathe, from Guidott,” an enclosure is marked with the figure of a horse, which was the Horse bath. Another plate represents the “ baths of Bath as they stood, 1676,” with a figure of the “ Fountain of the Haringtons at Kelweston Court.” In Warner's work are two plates. The first contains figures of the

But Mr. Bellot was not less a man of true benevolence. He founded and built a hospital for the entertainment of twelve of the most indigent men who might be licensed to come to the city ; allowing each man a room in the hospital during the months of April, May, and September, with fourpence *per diem* in money. In order to provide the poor persons thus admitted with proper instructions in the use of the Waters, Dame Elizabeth, Countess Scudamore, in 1652, settled a salary on a physician, to be elected yearly on April 15 by the Mayor and Aldermen of the city, to assist the patients with his best advice without fee or reward.

It was said just now that the first result of Corporate management was the rebuilding of the Cross and Hot baths. Before this, Leland says that the only approaches to the baths were called by the "pitiful name of slips," each consisting of a small flight of steps with a little cell at the head of it ; and this arrangement was found at every angle of the King's bath and the Cross bath. Brighter days for the city were dawning. The Cross bath was reserved for what were called the "better sort

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three larger baths, and the cross of the Cross bath ; the whole being evidently copied from Collinson. The plate is entitled "The baths as they stood in 1676." Another plate represents the Grand Pump Room.

of people," and a large house was erected on the north side of it (1602) for the accommodation of bathers. The Hot bath was immediately afterwards secluded from common use ; but at the same time a new cistern was made on the west side of that bath for the use of the "lame and diseased poor persons" who seem to have been rather uncharitably expelled from the Hot and Cross baths. This cistern received the name of the "Leper's bath," and it was accommodated with a small room for the bathers to dress in, which in time was called the Leper's hospital. While all this work was in hand, a large pond was made in a garden on the south side of St. James's Church, to receive the waste water of the King's bath. This was for some time used as a bath for horses, and called the Horse bath.

Thus was the zeal of the people stirred up in the reigns of Elizabeth and James I. to restore the public works of Bath, particularly those "houses of health" with which an opulent Nature had endowed her. Selfishness is at the root of some of our best actions ; and it must be acknowledged that what looked like patriotism was simply a wish to keep British subjects from flying abroad to similar medicinal fountains, at the "hazard of their lives," says Wood, "in crossing the seas ; and at a great expense, to the impoverishment of the kingdom,



and the enrichment of other nations." A more sincere public spirit was shown about the same time in the successful efforts to rebuild the Abbey. The mineral springs of Bath now became a subject of discussion among medical men, and the baths began to be resorted to by the rich and great. They were largely recommended by Dr. Caius, Dr. Jones, Dr. Venner, and Dr. Edward Jorden. Dr. Venner (1628) declared that the public baths of the city "appeared so fairly built, and fitted with such conveniency for bathing, as the like was not elsewhere to be found." The reader will laugh when he hears what this "conveniency" was. It consisted of such a communication between a few lodging-houses about the baths and the "slips" or ways into them, as enabled bathers to go directly from their beds into the hot Waters and to return to bed again. As for public accommodation, there was not so much as a hovel, even by the King's bath, wherein a guide or a poor person could deposit his clothes. The private conveniency of the baths did very well while the houses immediately surrounding them were sufficient to entertain all the bathers who came to the city ; but it was attended with this ill result, that the person in any such house promoted the use of the bath near which it was situated, whether proper for a patient or not. This carelessness, or dishonesty,

brought upon it Dr. Venner's swift and righteous denunciation. "And here," he says, "I cannot but lay open Bath's deceitful dealing with such as for the health of their bodies, resort to these baths. . . . The thing that I would have you to take notice of is, how the people of that place that keep houses of receipt and their agents (for such they have in every corner of the streets, and also before you come to the gates) press upon you, importuning you to take your lodging at such and such an house, near to such and such a bath, extolling the baths near which they dwell above the rest; respecting altogether their own gain, not your good or welfare. And when they have gotten you into their houses, they will be able to fit you with a physician: perhaps a doctor of their own creating, as some empiric, upstart apothecary, or the like (magnifying him for the best physician in the town), that will not cross them in removing you to another bath; though the bath near which you be placed be altogether contrary to your infirmities or state of body, or at least not so convenient as some other. And this is also a special reason why oftentimes many receive rather hurt than good by the use of the baths." Such were the early mischievous effects of private property being allowed to encroach on the sources of the hot springs. The Corporation did not

possess an inch of ground beyond the baths, and consequently their extension and improvement were perpetually hindered. The adjoining houses were mostly lodging-houses, owned and rented by physicians, and having openings directly communicating with the baths ; and the possession of these houses was an object of competition and private emolument, much to the public disadvantage.

At the time of the dissolution of the Monastery the natural baths of the city were under the care and management of a bath-keeper, whose chief profits arose from the "bathings" of the gymnasts and athletes in the adjacent tennis-court, which existed "for ages" on the east side of the area of the King's bath.\* But the lesseeship of the Corporation was attended with no immediate benefit, although all tolls and dues were paid to them as the exclusive guardians. In the time of James I. all order and propriety were so abandoned that on April 23, 1632, Dr. Jorden, in his Epistle Dedicatory of a "Discourse of Naturalle Bathes," complained to Francis Lord Cottington, Chancellor of the Exchequer, that the baths of Bath could not do that good for which God had sent them to us, for want of good government. The queen of Charles I. went to Bourbon, in France, instead of Bath, for it was

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\* This court is marked with the letter "L" in Dr. Jones's view of the city.

a common report that all kinds of "disorders had grown to their highest pitch here," and the picture drawn by several writers is almost incredible. It cannot be quoted entire ; but among other barbarities it is said that dogs, cats, pigs, and even human creatures were pushed over the rails into the King's bath, while the people were bathing in it. In the absence of an efficient police, the baths were represented as so many bear gardens, where every abomination and indecency were practised ; and these abuses were not totally checked until the middle of the seventeenth century. Some obvious and really necessary alterations were now and then attempted, but without any comprehensiveness of plan. For example, when the custom of drinking the Waters began, drinkers were furnished with Water laded out of the full cisterns early in the morning after the baths were clean, and before the bathers went into them. But this "poor shift," that did duty in Dr. Jones's time, gave rise to an invention "to come at the Water at any hour of the day, pure as it rose out of the bowels of the earth, and entirely separated from the Water of the bath ;" this was a conduit placed over one part of the spring in the King's bath. The machine appears in Speed's picture of the cistern (1610), and was copied by another writer in 1634. Notwithstanding all discouragement and dangers, there

were persons of social position who even in those days braved everything for the sake of being relieved of their infirmities. Thus Sir Francis Stonor received such a "great cure of his gout" in 1624, that he gave a considerable sum of money to the Corporation to beautify the city, and to construct a passage on the north side of the King's bath, as well as at the east and west ends. He also caused the whole bath to be surmounted with handsome stone rails.

At the end of September, 1663, King Charles II. brought his consort, Queen Catharine, to Bath.\* Sir Alexander Frayser attended them, and finding the hot Waters to be "from the same minerals" as those of Bourbon, sent all his patients afterwards to Bath instead of Bourbon. By this "the fatigue and expense of a long journey from the Britannic island to the heart of France, as well as the danger of crossing the sea, were avoided ; to the private advantage of the subjects of Great Britain, and to the public advantage of the kingdom." Sir A. Frayser attended Royalty, when its court was held in Bath at Dr. Peirce's house in 1663. The plain orthodox view was begun to be held that "English Waters would perhaps best suit English bodies ;" and a drinking pump was erected in the middle of

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\* The preparations for this journey to "the Bathe" are described in Pepys' Diary.

the King's bath "at the charge of the city." The number of Water-drinkers greatly increasing, and the benefit received becoming more known, a larger drinking-pump was fitted purposely for that use, and a pavement was made before it. Captain Henry Chapman, who was elected Mayor on September 29, 1664, put up an inscription near the Queen's bath, declaring artificial baths to be of little worth as being the works of Man, while there were natural baths at Bath prepared by Almighty God. The same Mayor placed an inscription near the Cross bath, importing that the bath had lost its name of "Cross," and that it should henceforth be called Queen Catharine's bath. When Sir Alexander Frayser came again in 1673, more pumps were erected, although some were so high that poor cripples complained they could not reach them. During his second mayoralty, in 1673, Captain Chapman published his description of the city under the title, "*Thermæ Redivivæ*," with a view, as he says, chiefly to "blazon the virtues of the hot Waters." In this book he speaks of his method contrived to draw the Water in its utmost purity from the spring before it can mix with the Water of the bath, and thenceforward people drank without hesitation. It was from about this time that Bath filled during the season with the "affluent and the noble." And we learn from

several authors that the Waters were carried in "bottles and runlets" to Bristol, Gloucester, Worcester, and even to London itself; and that this trade extended all over England, and even to Scotland and Ireland.

Soon after this (1676) the Corporation extended their bye-laws for the better regulation of the baths. A rigorous police put an end to the evil customs of smoking, singing songs, and making other disturbances; and so the repute of the city grew in the eyes of all "learned and virtuous persons." And though the city was still bound within the narrow compass of mediæval walls, many and more commodious houses were built. Dr. Guidott says that all the baths were then so surrounded with noble buildings for reception, that they appeared (in comparison with other towns remote from the metropolis) rather petty palaces than common lodgings :—

Balnea, Lympha, Forum, sic, Templum, Mænia, Rivus,  
Talia tam parvâ nusquam sunt urbe reperta.

Baths, Church, Rockwater, River, Hall, Wall-round,  
Such, in a little city, nowhere found.

At that time summer was the chief season for visiting Bath, as only then were the roads fit for travel.

In 1687, Mary, Queen of James II., came to Bath, and bathed for some time in the Cross bath.

The birth of a princess, ascribed to our springs, was commemorated in the erection of a splendid pillar by John, Earl of Suffolk. The pillar was constructed of marble, of a circular form, crowned with an hexagonal dome, and surmounted by a cross, with the support of three Corinthian columns ; the whole being decorated with a profusion of emblematical ornaments. The following inscription ran round the cornice and frieze :—

In perpetuam  
 Reginae Mariæ Memoriam,  
 Quam, Cœlo in Bathonienses Thermas  
 Irradiante, Spiritus Domini, qui fertur  
 Super aquas,  
 Trium regnorum hæredis  
 Genetricem effecit.  
 Utrique parenti, natoque principi  
 Absit gloriari  
 Nisi in Cruce Domini nostri Jesu Christi ;  
 Ut plenius hauriant  
 Aquas cum Gaudio  
 Ex Fontibus Salvatoris.  
 Deo Triuo et Uni,  
 Tribus digitis orbem appendenti,  
 Ac per crucem redimenti,  
 Hoc tricolumnare trophæum  
 Vovet dicatque  
 Johannes Comes de Melfort.

This structure was taken down in 1783, as the action of the Water had corroded the marble and



endangered the foundation of the fabric. About this time (1687) it was the custom of the daughters of the most respectable citizens to attend ladies of quality when they bathed. This office was performed to Queen Mary by Mrs. Mary Chapman, eldest daughter of Alderman Robert Chapman, one of the most "wealthy and considerable inhabitants of the city."

The point which next engaged the attention of the Corporation was the provision of better means for drinking the Waters. The free pump by the side of the Queen's bath supplied the drinkers with the water of the chief hot spring for more than 30 years ; and all degrees of people, in all sorts of weather, flocked to it in spite of its exposed situation. Bitter "rheumes and catarrhs" were said to neutralise the good effects of the Mineral Waters themselves. It would be better, wrote Dr. Oliver in chagrin, to drink the Waters at some distance from the pump, or even cold, rather than the patient should expose himself to the inconveniences of the open fountain. But what the solicitations of private citizens and medical men failed to accomplish, was done in order to gratify the ease and comfort of Royalty. Queen Anne and her husband, the Prince of Denmark, came to Bath in 1702 and 1703, and brought such a concourse of people to the city for the use and benefit of the hot Waters,

that the drinking pumps could not supply the needs of the sick. All the neighbouring villages, says Wood, were filled with persons of rank and fortune, who flocked to Bath for health and pleasure: and "lodgings were so scarce that many were obliged to pay a guinea a night for beds."\* It was now asked by the voices of a multitude—"How are we to drink the Water in winter without catching cold? After drinking from a hot spring are we to loiter about in rain and wind?" These were pertinent questions, and made the "guardians of the hot fountains" take a business-like view of

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\* Alluding to this crowd of valetudinarians, Dr. Peirce drily wrote that the place ought to be called Cripple Town, as Cripple Gate was from the cripples that used to lie there begging. Mr. F. W. Wyon, in his "History of Great Britain during the reign of Queen Anne" (1876), gives the following sketch:—"Bath had not hitherto become, what it afterwards became so signally, the first resort of pleasure and fashion in the kingdom. The short visits paid to the city by Elizabeth and Charles II. had failed to bring it into repute among the luxurious idlers of the Metropolis. Its extrinsic population consisted almost exclusively of invalids, to whom the hope of benefiting by its Waters gave courage to encounter innumerable discomforts. A person of this unfortunate class would, after a rough jolting over execrable roads, find himself landed in a little, close, unsavoury town, and in the danger of being torn limb from limb by a swarm of harpies in the shape of lodging-house keepers. The apartments in which he was at length installed were not of a kind to revive spirits exhausted by illness and fatigue. The invention of sash windows

the situation. Such was the germ of our present Pump-House or Pump-Room. A handsome room was erected on the north side of the King's bath, and a new pump was set up in it, so that "people of rank and fashion" might drink the waters, and walk about at all seasons of the year without risk of catching cold. It is recorded of a local physician that he contributed £100 towards the scheme. As the passage on the north side of the King's bath was only nine feet broad, the Corporation placed the Pump-Room over it, and extended the edifice to the fronts of some shops then standing on the south side of the yard, which had formerly belonged to Stall's Church. The shops were bought, and while matters were preparing for the execution of

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had not yet been adopted in this corner of England. The bed furniture was of the coarsest description ; the floor was coloured brown by a mixture of soot and small beer, and splashed with droppings from the whitewash which plastered the walls and chimney-pieces. The first care of the landlord, after settling an extortionate rent for himself, would be to introduce to the patient his accomplice, a self-styled physician, whose business it was to prove that the bath nearest the lodgings in question was the only one in the town suited to the patient's complaint. The visitors would, after employing the day in bathing, sweating, and lounging, assemble in the evening under a booth to drink tea and chocolate and to play cards, while the young and healthy members of their families danced on the bowling-green to the music of a hautboy and a fiddle."

the work, Mr. Nash (commonly called Beau Nash) came to the city, and the "sovereignty of Bath was decreed to him."\* The Pump-House was completed in two years; the event was celebrated by a procession and a musical fête, and by the public performance of the following composition:—

Great Blædud born a sovereign prince,  
But from the Court was banished thence,  
His dire disease to shun;  
The Muses do his fame record,  
That when the Bath his health restored,  
Great Blædud did return.

This glorious Prince of Royal Race,  
The founder of this happy Place,  
Where beauty holds her reign,  
To Blædud's memory let us join,  
And crown the glass from springs divine,  
His glory to maintain.

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\* A droll bit of social by-play characterised the beginning of King Nash's reign. The "greatest physician of the age" was accused of trying to ruin (by what he called casting a toad into) its medicinal Waters. But the Memoirs of the Academy of Science in Paris, in 1702, published the wonderful effects of music on those bitten by the Tarantula. "And so Mr. Nash set up a fiddle against the doctor's reptile, declaring that he would fiddle the amphibious creature out of the hot Waters; and by the power of harmony, charm every one on whom the toad should spit his poison into such a dance as should drive out the venom, and turn languishment itself into gaiety. So he triumphed!"

Let joy in every face be shewn,  
 And fame his restoration crown,  
     While music sounds his praise.  
 His praise, ye Muses, sing above,  
 Let beauty wait on Blaedud's love,  
     And fame his glory raise.

Though long his languish did endure,  
 The Bath did lasting health procure,  
     And fate no more did frown ;  
 For smiling Heaven did invite  
 Great Blaedud to enjoy his right,  
     And wear the Imperial crown.

May all a fond ambition shun,  
 By which even Blaedud was undone,  
     As ancient stories tell ;  
 Who tried with artful wings to fly,  
 But towering on the regions high,  
     He down expiring fell.

The Pump-House was put under the care of an officer who bore the name of the Pumper, and a pavement was made with large flat stones for the company to walk upon. And while the medical wants of the visitors were thus judiciously thought of, the necessities of recreation and exercise were not passed over. Nearly eighteen hundred pounds were raised to repair the road to Lansdown, that the "invalids might conveniently ascend the hill to take the benefit of the air." They were exempted from all manner of toll as often as they went out of

the city for "air and recreation." The "Legislature," says Wood, "would not allow the afflicted to have the least addition to their affliction even by so small a taxation as that of the duty for passing the turnpikes."

It is strange, however, that the amusement of so great a throng of people—just the sort of people who required to be amused—claimed very little attention from our municipal government. There was as yet no Assembly Room, and the company were obliged to drink their tea and coffee and to play cards in a common booth. At every proposal to alter and improve there arose a howl of sordid fear and envy from private monopolists ("Bath is undone! 'tis undone! 'tis undone!") lest the city should grow too large and accommodation for strangers too cheap. And there were members of the Corporation not ashamed to join in this cry. But the "titular King," Beau Nash, was a match for every grade of stupidity and inertness. He had no superior gift of wisdom, but he had much determination and great sagacity. Dr. Sutherland's portrait (1762) of him deserves to be presented entire. "A man of address, a polite scholar, a gentleman and a gambler; the founder of his own empire. He promoted charities, prevented duels, and determined quarrels. He regulated the diversions so as to improve, not impair, health;

and for 50 years his voice was law to those who could be swayed by laws of good manners. His dictation made gentlemen lay by their swords, and ladies dressed as at Court. He found Bath people in poverty ; he left them in affluence." Beau Nash was a man who partly created surrounding circumstances, while his character was largely moulded by them. He was a curious compound of drawing-room philosopher and cynic. But although solemn people still laugh when his name is uttered, it cannot be doubted that most of the material prosperity of Bath in the former half of the last century was due to him. He intuitively saw the beneficial effect of the Bath Thermal Waters, and resolved to make their fame and usefulness identified with the interests of the city. He laboured with zeal and singleness of purpose—mocked at for many small vanities and conceits—but honourably doing the work he had set himself to do.

In 1715 the number of strangers in and around Bath was computed at eight thousand. About this time the two chief hot springs of Bath were threatened with inevitable destruction. The profits arising from the distribution of the Waters excited the proprietors and possessors of land about Bath to "search the bowels of the earth for hot springs, that they might dispose of the Water as their own just right and property." Dr. Oliver lamented the

extinction in his day of the "traditional religion" formerly existing among the inhabitants of Bath, not to dig anywhere too deep for fear of disturbing or interrupting the sources of the Waters. He enforced the necessity of expelling "all private property to a proper distance from the heads of our sovereign fountains, and to enlarge the bounds of the baths, so that the springs may be preserved for the benefit of posterity." Swallow Street preserves the name of an unpatriotic citizen who thus tried to tamper with the natural flow of our medicinal wells.\*

Let us now hear what Wood—our own historian and architect—says of the bathing conveniences in his day (1749). Simple cisterns received the hot Waters, containing such quantities as were necessary for the purposes of bathing. The bathers were provided with little cells in which to undress and dress again; and flights of steps descended from the cells to the bottom of the Water. The Leper's bath had still a great fame, and was styled with affectionate phraseology, "our little bath," but it

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\* During the middle ages there were two baths within the limits of the monastery; one was called the Abbot's bath and the other the Prior's bath (see p. 66). On the Dissolution, these baths were probably disused and filled up. It was the offence of one Alderman Swallow that his property being on the site of these baths, he dug secretly down with the intention of diverting or purloining the Waters.



was much exposed to winds. The Hot bath was better protected by the height of its surrounding walls ; but it “made an abject appearance to the ways that surrounded it.” The Cross bath was the one most used for purposes of luxury by “people of fashion ;” it was kept in good order and surrounded by a high wall. From Leland’s days this bath was the most celebrated of all, the spring rising higher than the spring in the Hot bath ; but some diminution in it had lately caused alarm. The King’s bath was then little better than an untidy dungeon. The “slips” leading to it were like cells for the dead, and were more calculated to “fill bathers with horrors of death” than to raise their idea of the efficacy of the Waters. The cold stone of the steps was wet with condensed steam, and the bathers were exposed to every wind of heaven, which Dr. Peirce rightly thought to be more prejudicial than rain or frost. The irregular walls of this “pit of deformity” were incrustated with dirt ; ugly buildings encroached on all sides ; and idle spectators thronged the passages and gazed through windows. The east and west recesses of the King’s bath were called the “kitchen,” from the excessive heat there ; and with similar humour part of the Queen’s bath was called the “parlour,” on account of its moderate and enjoyable temperature. A figure, said to represent King Blaedud, was seated on a niche on

the south wall of the cistern ; of this faithless image, which still exists in the same place, Mr. Wright says that "having for many years represented King Edward III. in a niche above the North Gate, it was transferred to the baths, adapted to an earlier age, and placed in its present position, so that though a false Blaedud it is a true Eikon Basilike."\* "Little, dark, dirty, narrow tunnels," continues Wood, "approach the King's and Queen's baths ; the very best being less conspicuous than the meanest inn in the neighbourhood." Were the citizens ashamed of the Hot Waters, their "staple commodity ?" Those who came for health were often disappointed and disgusted ; but in spite of all remonstrance Wood's grand and eligible scheme for a reform (and to a large extent rebuilding) of the baths was defeated and shelved by the selfish dissensions of the Corporation. Fourteen years later (1763) Dr. Sutherland was obliged to lament that Waters long discerned, and since richly adorned, lie now rude, neglected and uncultivated. "People have long lamented," says the Doctor, "and

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\* Beneath the statue is the following inscription :—Blaedud, son of Lud Hudibras, eighth King of the Britons, from Brute, a great philosopher and mathematician, bred at Athens, and recorded the first discoverer and founder of these baths, 863 years before Christ ; that is, two thousand five hundred and sixty-two years to the present year, one thousand six hundred and ninety-nine.

continue to lament, the danger of bathing. As simple artificial baths were objects worthy of a Trajan, why should not natural hot medicated springs be thought worthy of George ?” Speaking of Westminster Bridge just built, Dr. Sutherland asks with pathos and power whether superannuated seamen may gape at Attic elegance while princes wallow in horse ponds ? “ Shall the General Infirmary of the nation be stunted while Chelsea pensioners walk at their ease ? why should the bounties of heaven be restrained ? In the security of the springs, and in the restoration of the baths, Prince and People are equally concerned.”

Attached to the baths were Serjeants, Cloth-women, and Bath-guides. The Serjeants bore the rank of gentlemen, and their business was to preside over the baths, the wet and dry pumps, and their several officers : to see that patients were properly attended, and to prevent every kind of disorder. The Cloth-women assisted the bathers when they went into or came out of the baths, and laid proper cloths for such persons to stand upon. The Bath-guides supplied bathers with linen, attended them in the baths, and worked the dry and wet pumps. The Cloth-women were often obliged to stay in the Water five or six hours at a time, and sometimes eight or nine in the whole day. Dr. Peirce tells us that when he first came to live in

Bath there were two Bath-guides (Newman by name) so old as to make nine score years between them. It was a subject of jocular remark that the skin of the guides was usually dyed a yellow brown by the Water ; and the linen of the bathers was stained in a similar way.

The general social life of Bath during the last century is altogether beyond my present scope ; but I may offer a sketch of what the "town" used to do in the earliest years of the reign of George III. At eight in the morning "gentlemen and ladies" met in the Pump Room, some to drink the Waters, others to converse. From eight to ten the company were entertained with a band of music. Ten was the universal hour for breakfast, which was obtained either at lodgings or at coffee-houses. Sometimes there were public "concert breakfasts," with a dance. In the middle of the day everyone took exercise, and three o'clock was the common hour for dinner. The evening amusements always began at six ; at eleven o'clock the Master of the Ceremonies pointed to the orchestra, and at his nod the fiddlers vanished. Everybody was at home and quickly in bed before midnight ; sensible people ! The Pump Room had been enlarged in 1751, and towards the close of the century was accommodated with a beautiful portico, besides being adorned with a "superb western frontis-

piece." Dr. Sutherland was so enthusiastic about the prospects of Bath, that he broke out into prophecy. "Bath," wrote he, "will in time be one of the largest and most elegant cities in the world ; nothing but failure of the springs can prevent it." But it was a tragic cloud on a bright picture to be compelled to add, "Every lodging-house is a hospital."

In the Orange Grove there is a small obelisk, which was erected by Nash in 1734. An inscription is on the pedestal, setting forth the benefit the Prince of Orange received by drinking the Bath Waters ; and conferring on the Grove the proper name of Orange, in compliment to the prince. The inscription is on the east side of the pedestal, and the royal arms adorn the west side. The south side of the Grove had a gravel walk 200 feet long and twenty-seven feet broad, and it was the general resort for pleasure and exercise. Here, and in Harrison's Walks—which were parallel to, and at the back of, the present Royal Literary and Scientific Institution—the grand folk assembled every afternoon, and promenaded during music. Three rows of tall sycamore trees lined the two other walks, parallel to the former, which were spread with gravel, and were intended for the "use of the common people." There were houses on the south side of the Grove, and a fence on the

north side ; and “rooks built nests” in the trees. It is said that “persons of fortune” preferred lodging near this open area to any other place during their stay in Bath. Many visitors took “air and exercise” on horseback, and some in coaches ; some walked in Queen’s Square, and not a few strayed in the meadows around the city.

About the middle of the last century (1755) an interesting archaeological discovery was made, which is thus briefly related by Mr. Wright :—The noble proprietor (Duke of Kingston) of that portion of the old Abbey estates which included the Priory or Abbey House, proposed to erect here private dwellings, suited to the locality. In sinking for foundations, several stone coffins and many Saxon coins were discovered. Descending a few feet deeper, the explorers found extensive remains of Roman baths, including the usual appendages of hypocausts, sudatories, and *frigidaria* ; and the source of the Water was another hot spring.\* In the beginning of the present century these baths and buildings—called the

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\* There is a good and detailed account of these remains of the “splendid Roman baths” in the Rev. J. Collinson’s “History and Antiquities of Somerset” (1791), Vol. I., p. 9.

Prebendary Scarth, in his superb volume, “*Aquæ Solis*, or Notices of Roman Bath,” gives a full account of the ancient Roman baths, with a ground plan and a section.

Kingston, and also the old Roman, baths—were leased for a long term to Dr. Wilkinson, who added a pump room, and constructed three well-appointed private baths and dressing-rooms adjoining. A subsequent lessee has added many improvements, including vapour baths, which may be medicated, and facilities for reclining and shampooing baths. Further discoveries of remains of Roman baths were made in 1799 and 1803.

Early in the seventeenth century, when the popularity of the Bath Waters had revived, many persons of rank left here some memorial of their recovery. This token of gratitude assumed the conventional form of a ponderous brazen or copper ring, inscribed with the name of the donor, and fixed securely in the wall of the bath. Dr. Granville is sceptical about the votive quality of these rings, and supposes that a number of them were inserted in “old times” for the benevolent purpose of helping the feeble, the cripple, and the paralytic. But the inscriptions on most of the rings are decisive evidence of their original intention, though there may have been a secondary intention to benefit others. Many of these inscriptions had become obliterated ; but on all the rings that remain the Corporation caused the inscriptions to be renewed during 1862-63. A record or register of these thank-offerings was made by

Guidott (1691) and Warner (1801), from which it appears that 213 rings were originally presented and attached to the walls of the different baths ; but only twenty-eight can now be found. In the King's bath there were 104 ; in the Queen's bath, 31 ; in the Cross bath, 40 ; in the Hot bath, 33 ; and five have been presented since 1724. A few of these rings and their inscriptions deserve a more special mention. At the entrance from the King's to the Queen's bath is placed a massive ring of brass, and on it is inscribed :—" I, John Revet, His Majesty's brazier, at 50 ye. of age, in ye present month of July, 1674, Received Cure of a True Palsie from Head to Foot on one side. Thanks be to God." A large ring has engraved upon it :—" Barbara, Duchess of Cleveland. Anno Domini 1674 ;" on the staple are the Royal arms with the bar sinister, surmounted by a coronet. A third ring is largely and handsomely ornamented, and has the legend : " Lydia White, Dawter of William White, citizen and draper of London, 1612." And Sir Thomas Delves, Bart., of Doddington, in the county of Chester, presented a ring with this inscription on one side :—" Thomas Delves, B. By God's Marcy and Pumping here formerly ayded ;" and on the other, " Against an Imposthume in his head, caused this to be fixed, June the 13, 1693."

The thread of my story is gradually drawing near



our own times and our own state of society. Before the close of the last century, Bath had become in all its main architectural features very much what it is now. A rival the city can never have in its situation, beauty, salubrity, and shelter, to say nothing of its many social privileges ; but seventy and eighty years ago Bath had a position which was in some respects unique. There were then thermal springs and bathing establishments in various parts of the Continent, just as there are at the present day ; but they were virtually inaccessible to travellers and invalids by reason of war, revolution, and misgovernment. For twenty-five years the greater part of the Continent was a sealed land. For health or luxury the only thermal springs that could be reached were at Bath, which was filled with people of every rank and of all fashions, gathered from every corner of our island. It has been satirically said that Medicine becomes a science in proportion as disease follows in the wake of luxury : and there was enough irrational luxury in those days to beget any amount of scientific Medicine. But sympathy, if not science, made a crowd of sick creatures post to Bath, for no convalescence was deemed secure or respectable which was not confirmed by a trial of our hot Waters. And brains came here as well as bodies ; statesmen, diplomatists, men of University distinction,

artists, bishops and peers, all contributed to make society brilliant and interesting, and to wile away many a dreary hour of enforced seclusion. Mrs. Chandler's lines, quoted by Dr. Sutherland, prove that the hygienic qualities of Bath had gained a fair repute :—

“ When fevers bore an epidemic sway,  
Unpeopled towns, swept villages away,  
While death abroad spread terror and despair,  
The plague but gently touched within our sphere.”

And so, exclaimed Dr. Granville forty years since, “haste away! Do not waste your life and your purse in swallowing endless drugs, and ringing the changes of remedies and doctors; or in being lifted in and out of a carriage, the prey of some chronic and insidious disorder, baffling to your physician's skill; perhaps sent about for change of air, and going home exactly as you left it. Fly from the evils of towns to some spring of health, and, depend upon it, that either at the first, or at the second, or third occasion of visiting and using such Spa, you will have reason to rejoice that you exchanged art for nature. Let no physician, however high his claim to confidence and support, but who is not acquainted with the wondrous and striking effects of mineral Waters on the human body in a state of suffering, set up his individual voice against this plan.”

The obvious divisions of Old Town and New Town were applied to Bath in the latter half of the eighteenth century. The domestic convenience and embellishments of the New Town, the splendid solidity of the houses, and the protection afforded by the surrounding hills, combined to make Bath a very comfortable winter residence. But a large population of valetudinarians still clustered in the Old Town, preferring to sojourn near the fountains from which they hoped to reap health and happiness. The contrast between Old and New soon became oppressive. Among the most striking wants was that of a larger and finer Pump Room. An Act of Parliament had already enabled the Corporation (magnificent things were done in those days by close and irresponsible bodies) to clear away a nest of unhealthy and narrow streets, which made the approach to the baths from the Upper Town a task of difficulty and even danger.\* The first improvement effected was the erection of a colonnade (1786) between the Abbey Churchyard and Stall Street ; and another colonnade to match the former was added in 1791, forming the entrance to the King's and Queen's Private baths. At the same time there was built that "admirable specimen of

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\* The reader may be referred to an account of the old Bear Inn in Anstey's "New Bath Guide," p. 147. The Bear Inn and its precincts stood where Union Street now is.

workmanship and design," the western elevation of the Pump Room ; the old Pump Room was wholly taken down in 1796, and the present "noble saloon of health, pleasure and convenience was erected on its site, from Mr. Baldwin's designs." I do not describe what everyone can see and admire ; but concerning the Greek legend on the pediment (suggested by Samuel Johnson) it has been justly said that nothing can be more inappropriate, for the Water is as remote in its quality from *aqua pura* as a natural fluid can well be. Dr. Granville called the Grand Pump Room (as it appeared in his day) a "barren and unfurnished room ;" but much has been done since that time to decorate and enliven with colour and other ornament. A semicircular alcove has been constructed, and a new fountain placed in it. Stringed music is discoursed from an orchestra three times a week in the winter and early spring ; but we may laugh at Dr. Granville's fanciful statement that to be present at the promenade concerts is "*une affaire de rigueur*" for the "*élite et elegants* of this beautiful city."

In spite of the abundant proof that invalids came to Bath not merely to gaze at natural beauties, but to be cured of unnatural infirmities, contemporary evidence goes to show that the baths were not made the most of by the citizens themselves. They seemed to refuse credit to the obvious fact that hot

medicinal springs might be the medium of health and wealth and general prosperity. It is true that the baths could now be conveniently approached by all comers ; no dark alleys and crooked avenues blocked the way ; nor was there anything in the baths to repel the delicate and the timid. But an author\* who wrote in 1820 tells the world that the baths with their appendages (the Grand Pump Room only excepted) "are among the most insignificant of the public edifices." And he emphatically asks, "What are the causes of this neglect of the sources of all the glory and prosperity of Bath?" It might have been answered—too much reliance on scenery, situation, a rare and happy conjunction of local circumstances, and perhaps the injudicious words of those who exalted and praised the city as the "great national resort of the sick and infirm, entirely without a rival." But some of the older physicians playfully adverted to the absence of the causes of disquiet and alarm with which other cities abounded. "There were no popular tumults," said they, "no midnight riots, and even the cry of fire was seldom heard in the streets ; while the storms of faction swept aloof from the favoured place !" Royalty was gracious

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\* Mr. J. G. Mansford, who compiled a pleasant little volume, "The Invalid's Companion to Bath," and the memory of whose amiable character is still honoured by several surviving friends.

to Bath, too, for in the early part of this century the large house (94) at the east end of Sydney Place was occupied by Queen Charlotte, wife of George III. On the 1st of August, 1827, Bath was visited by the Duchess of Clarence, afterwards Queen Adelaide, wife of William IV. ; and in September, 1830, the King of the Belgians came here. Five weeks afterwards, our Park was formally opened by her present Majesty, in company with her mother, the Duchess of Kent.\* But the new and reformed Corporation had so much to do that no time was found to put the baths into first-rate order until 1862 or 1863. The idea then began to grow and to bear fruit, that Bath had a claim to national consideration so singular and so paramount that we might without extravagance spend money in making the baths commodious, clean, and even sumptuous. Only think, was the general cry, what some municipalities would do with such opportunities, such hot springs — matchless in this country for heat and curative power ! Travellers wondered at our sluggish ways, and told us how Continental Spas were “up and doing.” Would we

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\* The obelisk in Queen's Square commemorates the visit of Frederick, Prince of Wales, in 1737. The Abbey House, which was taken down in 1755, was popularly known as the “Royal Lodgings ;” and the West Gate, removed in 1776, contained a suite of apartments often used by Royalty.

allow ourselves to be beaten out of the field when such a free and plentiful gift had been conferred upon us—wasted to a large extent from want of knowledge and want of management?

It must be admitted that the meeting of the British Association for the Advancement of Science at Bath, in September, 1864, had an influence which was not less powerful because somewhat indirect. Many of the sections assembled in the Mineral Water Hospital, and the members were thus brought into contact with the economy of an institution which has done great service to countless poor people, and has educated a number of medical men in the medicinal value and application of the Thermal Waters.\* But the very size and catholicity of the Mineral Water Hospital suggested the enquiry why was not something of the same kind

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\* I am relieved from the necessity of giving a history of the Mineral Water Hospital by a small volume published by my colleague, Dr. Falconer, in 1869 (second issue), entitled "An Account of the Bath General or Mineral Water Hospital." In a pamphlet entitled "A Short Account of Warm Bathing in Paralytic Disorders" (2nd edition, 1751), the author, Dr. John Summers, of Bath, enumerates as the reasons for the Bath Infirmary, "that the undertaking would contribute to render the nature and efficacy of the Bath Waters more certain and extensive, and thereby be a benefit to succeeding generations." It was in connection with this Hospital that Dr. Sutherland commemorated the "secret bounties of Ralph Allen."

attempted for other ranks of society, including all who were willing to pay for assistance, under similarly favourable conditions? The organising power was there, and the fostering care and skill, but how were the necessary appliances to be prepared and made useful? It was remarked that with such an enormous surplusage of water there was yet no provision for chamber bathing at the principal hotels—a common arrangement abroad—and no means anywhere for taking a patient immediately from his bed into a bath and back again. These were the ideas and questions current among lay and professional people in Bath during 1864 and 1865; and a conviction arose that much might be done to improve the baths, to extend the bathing accommodation, and thereby to advance the best interests of the city.

The traveller who passes along York Street from Stall Street notices almost directly on his left an enclosure, which probably enshrines as much quiet domestic history as any spot of equal size in the world. This petty boudoir of hot green sparkling Water is surrounded on two sides by an open lattice-like wall, and the man must be dead in an antiquarian sense who can peep into this cabinet without some emotional stir. Here has been enacted a large part of that social drama which it is one of the objects of this volume to unfold. The first thing noticed



is a reservoir, constructed in 1833, and capable of holding 32,000 gallons : the Water comes from the King's bath, and is here allowed to cool. With this cooled Water the temperature of the adjacent baths is regulated. The reservoir contains a number of gold fish, and a fountain plays in the centre. On the left is an engine-house for pumping hot and cold Water into the large tank or reservoir at the top of the private King's and Queen's baths. A little further is the small cistern called the Queen's bath, the history of which has been given ; it is at the south-west corner of the King's bath, from which it is supplied, and from which it is separated by a simple and movable partition. The Water in the Queen's bath is still, and cool in proportion to its distance from the main spring ; the bath covers an area of 25 feet square, and is calculated to hold 19,000 gallons (the average temperature of the Water being  $100^{\circ}$ ). Beneath blank arcades, on the north and east sides, are stone sedilia ; and some votive rings are attached to the adjacent walls. Four dressing-rooms and one reclining bath-room are appropriated to the Queen's bath, and are accessible from the open Water. We may lament the loss of the splendid memorial erected by the inhabitants to the honour of Anne, wife of James I. ; but the Chapman tablet (it is said) still exists. The traveller now leans over the Elizabethan balustrade

of Sir Francis Stonor (restored by the Corporation in 1863), and beholds the agitated cauldron of the King's bath. Here, in what are still absurdly called the "palmy days of Bath," might have been seen (at an early hour) the "fair sex, full toiletted and *bien coiffées*, wading up to their chins, escorted by their cavaliers with powdered hair and bag wigs, indulging in all the luxury of the bath at a temperature of 105°."\* The area of the King's bath measures 59 feet in length by 40 feet in breadth; and, when filled to the depth of  $4\frac{1}{2}$  feet, contains 346 tons, 2 hogsheads, and 36 gallons of Water. The spring is situated near the centre of the bath, and the Waters issue impetuously (at the rate of  $2\frac{1}{2}$  hogsheads each minute) through a perforated iron plate, as well as through apertures around it. The bather who takes an early morning perambulation through the bath (*sub cælo*) will find himself in "very hot Water" within the central railed enclosure, and he is sensibly borne upwards by the fluid and gaseous currents. Let him watch closely the tumult of nitrogen emitted from the surface of the bath. The bubbles come regularly and quickly, and the Water sways to and fro. Now and then

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\* In the Treasurer's Office of the Guildhall is an engraving (not dated, but apparently about a hundred years old) which represents this scene. In the centre of the King's bath is figured the imposing structure which formerly stood there. It is right to say that I cannot find in the Queen's bath the Chapman tablet, mentioned on the previous page.

a huge bubble breaks through a placid bit of Water, and these little aerial commotions rustle and ripple without ceasing. At the sides of the bath the temperature of the Water is not above 100 degrees ; it is scarcely affected by the tiny storm in the centre, and the bather will not care to go where he sees some of the unavoidable touch and soil of this "work-a-day world." The brass rings and their legends are worth looking at, and an inscription close by the so-called figure of Blaedud announces that a relief from "gout and aches" prompted Sir Francis Stonor to make his generous presents. On the west side of the bath are four *sedilia* beneath an arcade ; on the north side two semi-enclosed vaulted recesses communicate with the corridor above, and with the open bath outside. Eastward are some steps, which may be a relic of the "slips" in years gone by. Almost overhanging the bath is the long south side of the Grand Pump Room, with its projecting apse which contains the fountain. The stone chair which "Anastasia Gray" gave in 1739 is affixed to the south wall of the bath, but is under the usual surface of the Water. The pavement of the bath is here and there so slippery to walk upon that fine sand ought to be strewn over it, according to a suggestion long ago made by Dr. Granville.

The private King's and Queen's baths were built

in 1788, and are entered from Stall Street. The dressing-rooms attached to the open Water are approached by a winding staircase. There are six private baths (tile-lined) above the level of Stall Street, which are supplied by the great reservoir mentioned just now ; and every bath has a dressing-room connected with it.

The Cross bath is at the end of Bath Street, and faces the King's and Queen's private baths. The present building was erected in 1790 by Thomas Baldwin, city architect ; and all the antiquities of the old Cross bath have perished, save a figure of Blaedud, in alto-relievo. The bath is 23 feet long by 22 feet wide, and is of irregular form. The Water flows at the rate of half a hogshead each minute, and its average temperature (100°) is the lowest of all the springs. About 1840 a portion of the Cross bath was set apart as a spacious tepid bath for ladies ; but as it was not much used, the whole area was afterwards appropriated as a second-rate bath. The Cross bath is now used chiefly by the labouring classes, the price of accommodation being within the reach of the most frugal.

The Hot baths, or Royal Private baths, are on the south side of the west end of Bath Street. This spring is really of the highest temperature (120°), and a hogshead and a half of Water is supplied each minute. The present building was erected in

1777 (from a design by the younger Wood), the foundation-stone having been laid in the previous year by Leonard Coward, Mayor. The Hot bath was once known as the Leper's bath (p. 67), and the spring rises in its centre. The form is octagonal, and the angles are occupied by *sedilia* : varied mouldings adorn the walls, and the whole is crowned with an interrupted balustrade. Patients from the Royal United Hospital are allowed to bathe here ; and the sick poor generally may gratuitously enjoy the same privilege by a medical certificate, countersigned by the Mayor, or a Magistrate who is also a member of the Town Council. There are seven private baths, one of which is lined with marble, and the others with glazed tiles. Over one of these baths an arm-chair is suspended from a crane, by which a helpless invalid is gently and gradually lowered into the Water. Here are provided a lavement apparatus, and douche, reclining, and shower baths. Dr. Granville's notes may be quoted here :—" A running corridor affords access to the apartments, each suite including a dressing-closet, lofty, well lighted from above, carpeted, having a fire-place, sofa, dressing-table, mirror, and every other accompaniment of the toilette required by the most fastidious. These baths are kept in a state of accuracy, cleanliness, and order, not to be surpassed in any establishment of the kind." As part of the

same establishment a tepid swimming bath was added by the Corporation in 1829, the entrance to which is from the piazza in Bath Street. This bath is in the form of an oval, and is 62 feet long by 22 feet wide. With a depth of  $4\frac{1}{2}$  feet, it contains 3,600 gallons of Water, kept at a tepid heat ( $88^{\circ}$ ) by the admixture of Thermal Water from the King's bath and of a comparatively cold supply from the reservoir. The bath is lighted by three domes, open at the sides, and by a window at one end. There is one public and six private dressing-rooms, and at the east end is the figure of a dolphin. The vast quantity of Water required for this swimming bath is only one-tenth of the surplusage of the King's bath, and Bellot's Hospital is also supplied from the same source. Outside the Royal Private baths is a "free pump;" and a new pump has been erected inside the premises for the accommodation of those drinkers who used to frequent the (now abolished) Hetling Pump Room on the opposite side of the road.

In 1865, a number of citizens associated themselves into a Limited Company for building the Grand Pump Room Hotel; and the Town Council recognised the opportunity for providing a suite of baths on an elaborate scale in conjunction with the hotel. The undertaking was successfully accomplished, not without many difficulties: the hotel

was built, and the baths form its south wing. We pass through a vestibule and enter a spacious waiting-room, and thence into a long corridor, which is 180 feet long by 8 feet wide, and 14 feet high. It is lighted throughout by a skylight, and the floor is laid with encaustic tiles. The various baths are approached right and left from the corridor. They consist of six private baths, each holding about 780 gallons ; and to each bath there are attached a comfortable dressing-room and a closet. There are also three reclining or slipper baths, each capable of containing 220 gallons ; two “dry douche” baths ; a lavement bath ; and a vapour or steam bath, with a shower-bath annexed. In each of the private baths the wet douche can be applied by continuous or intermittent baths. There is a hot closet for bathing linen, and sundry offices for the attendants. From the end of the long corridor some steps lead to the Ladies’ Swimming bath, which is 51 feet long by 27 feet wide ; it holds 33,150 gallons of Water, supplied by a syphon from the King’s bath Spring, cooled to a proper temperature. The area is entirely covered with ventilating skylights, and the bottom of the bath inclines from 3 feet 3 inches to 4 feet 6 inches. At the eastern end in a coloured niche is a “very beautiful statue of a nymph bathing, carved in Painswick stone, the last work of the late Mr.

Joshua Wall, a young artist of Stroud." This work was the gift of the architect and builders. There are one public, and five private, dressing-rooms attached to this swimming-bath, which has lately been reserved for the use of each sex on alternate days. The corridor above-mentioned can be reached from the interior of the hotel; and close by is a large hydraulic lift, by which a person can be lowered from any story in the hotel to the baths below. There is also a capacious bath fitted with an invalid's chair; this is fixed to a crane, and a patient can be removed from the hotel to the dressing-room, and from the dressing-room to the bath, without any difficulty. Without desiring to write a word of partial or exaggerated eulogy, it may be said that Bath can now challenge Europe for another set of baths equal to our own in design, sumptuousness, and general convenience. The immediate management of all the baths is vested in a superintendent, an assistant-superintendent, and several attendants upon the bathers; and it is to the energy and care of these officers that much of the comfort and success of the system of bathing is due.\*

The New Royal baths were opened on Feb. 2,

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\* Visitors should recollect that all tickets for baths must first be procured from the office on the lower side of the entrance to the New Royal baths.



1870, with some civic ceremonial. A procession was formed at the Guildhall, led by policemen, boys of the Blue Coat School, and the sergeants-at-mace ; then followed the Mayor, the Bishop of Bath and Wells, and several of the clergy ; and afterwards came the Town Clerk, Aldermen and Councillors, and many of the citizens. The inauguration took place in the apartment just described as the Ladies' Swimming bath—converted for the occasion into *terra firma*, and furnished with a carpet and chairs at one of the ends. A suitable speech was made by the then Mayor (T. W. Gibbs, Esq.), and three appropriate prayers were said by the Bishop. A hymn was then sung, the Lord's Prayer was said by the late Rector of Bath (Rev. C. Kemble), and the ceremony was closed by the Bishop pronouncing the Benediction. The procession was then re-formed, and after the company had returned to the Guildhall, the Bishop congratulated the Mayor on the good work which had that day been begun.

The baths are managed by a Committee ("Baths and Pump Room Committee") of the Town Council, the members of which are unwearied in their efforts to promote the smooth and successful working of every part of the bathing establishment. During 1875 there was a large increase in the numbers of bathers ; so that, although for some

years the expenditure on the baths had exceeded the income, the income is now far above the expenditure. A considerable sum of money was recently laid out in redecorating and refurnishing the whole of the baths ; a new table of fees has been arranged ; and steps have been taken to extend the knowledge of our hot springs throughout Great Britain and the Continents of Europe and America.\* Bath is not likely to lapse again into the condition of which Dr. Granville could say (1841) that his professional brethren seemed to have nearly forgotten that such a Mineral Water was in existence. There was a time, adds the Doctor, when hardly one of the leading physicians in London would think his patients (if able to afford a trial) completely recovered, unless the treatment were concluded with “a course of the Bath Waters.”

Three interruptions are recorded to a constant flow of the Waters. Once it happened from the sinking of a shaft in search of coal at Batheaston. In 1811, an escape of Water took place from the springs, rendering it necessary to “puddle” the ground from which they rise. And in 1835, when a well 170 feet deep was dug at a westward distance of 250 yards from the King’s and Queen’s baths, a stream of hot Water burst into and over-

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\* The exertions of that useful body, the Bath Attractions Society, may here be cordially recognised.

flowed the well : the supply to all the baths (except the Kingston) was materially diminished, and the temperature went down. The flood of January, 1809, found its way into all the baths, and stood seven feet above the natural bed of the warm springs. Warner pointed out the grave necessity of trying to put a stop to the inundations so common in those days, lest they might injure the hot springs by disturbing the argillaceous strata on which the springs flow, and diminish their temperature by the admixture of foreign water.

It is the charter of the critic to find fault, and there are little spots and flaws in our arrangements which might be easily removed. In studying the climate of Bath, we shall see bye and bye that there are sufficient physical reasons why it cannot be a bracing summer residence ; but this should be a spur to our endeavours to mitigate the less agreeable incidents of the warmest months. It is a great loss that the Orange Grove is not the pleasant shady lounge which it was more than a century ago. The Institution Garden is everything that can be desired ; but it is a trifle too far to be an appendage to the hot springs, and a difference of level is always objectionable to the disabled invalid.\* Then,

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\* Nevertheless, more use might be made of this Garden, and some years ago a band played during the summer on two or three days in the week.

within the memory of some persons living the North Parade was a paved promenade, and old engravings attest how thoroughly our crippled forefathers enjoyed the quietness and luxury of walking and gossiping on the Grand Parade.\* The specialities of these parts of the "Old Town" should have been jealously preserved, as essential adjuncts to a mineral Spa; a direct communication is wanted between the Grand Pump Room and the Royal Literary and Scientific Institution on the south side of the Abbey; and the main traffic to and from the Great Western Railway Station might have been diverted to another route. Further, the houses in Bath Street should have been kept as lodgings for middle-class invalids; the obvious intention of the piazza being to provide a sheltered place for exercise. We are too slow in learning lessons from foreign watering-places.

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\* In the Registrar's office of the Mineral Water Hospital are some beautiful pencil sketches (the property of Mr. Starr, the present Registrar), which represent the Parades as they were about a hundred years ago. I possess an uncommon print of a "Drawing taken by Eliz. Claybourn Crossley, from the corner house at the east end of the North Parade at Bath, for which drawing she had the honour of a Gold Medal as a premium from the Society of Arts, Manufactures and Commerce, in the year 1759." Ladies and gentlemen are represented in the costume of the period, and there is a figure of a sedan chair and its two bearers.

The traveller remembers with delight the Eliza Gardens at Aix-la-Chapelle, the busy crowds drinking the Waters between seven and eight o'clock on summer mornings, the cool retreats and haunts, and the brilliant band of music.

Nature has been bountiful in adorning the neighbouring country with trees, but few or none are to be seen in the streets of Bath. Think what the avenue of Pulteney Street would be if embellished with a row of fine trees on each side of the road. How visitors pant, when walking up and down the South Parade, for a little of that "umbrageous multitude of leaves" which flourish in every surrounding vale and dell.\* On a burning day in July it is a matter of pain and almost of peril to traverse the short broad road from Gay Street to the Victoria Park ; but when a generous citizen offered a few trees for ornament and shade, his gift was declined with bare courtesy. A row of trees might be planted in the central line of the Abbey Churchyard (running E. and W.), and each tree should have at its foot a circular bench, removable at pleasure. A fountain in the same site would be very charming, but it is much too good a thought

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\* Just before publication I learn the intention to plant trees on the South Parade. It is only fair to our fellow-citizen, Mr. Charles E. Davis, to say that he promoted the design of planting trees in our streets more than ten years ago.

ever to be carried out. Evelyn remarks, either in his "*Sylva*" or in one of his other works, that trees help to sweeten the air of great cities ; and the idea of health may plead with those to whom a "thing of beauty" is neither a joy nor a care.\* But my concern just now is, how can we render Bath—as a *Spa*—attractive during the summer months? Firstly, if there be sometimes too much heat and light, let us provide plenty of shadow, and resting-places which shall be cool and pleasant. Then it has been for many years the habit to speak of Bath as so completely a "winter place," that the specific amusements and recreations of winter are partially or entirely withdrawn during the summer. This ought not to be. There are a number of persons to

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\* Some researches on the ozonigenous powers of flowers and sweet-smelling herbs have been published by Professor Paolo Mantegazza, of Pavia. In some plants ozone is developed by the direct rays of the sun, while in others the action once begun in solar light continues in darkness. The ozonigenic properties of flowers reside in their essences, the most odoriferous yielding the largest amount of ozone ; and the Professor therefore recommends the cultivation of herbs and odorous flowers in marshy districts. The sunflower is said to have extraordinary ozonigenous powers, although it possesses no particular perfume. Window-gardening may cultivate the mignonette, thyme, laurel, and lavender for the sake of their purifying odours. In our cities let us emulate the citizens of Laurentum, and plant sweet bay along our embankments, in our parks and gardens, and even in our deserted churchyards and fast-filling cemeteries.

whom spring and summer are the natural and only possible seasons of travel, whether for health or for pleasure. The invalid comes to Bath in May or June (the best time of the year), and he finds the Grand Pump Room silent and comparatively deserted ; he cannot, or will not, adjourn to the Sydney Gardens or the Victoria Park ; he asks to be amused in his own way within his own little compass. Yet this is just the time when we in a metaphorical manner close our doors, and announce that the “season is over.” Nearly all Continental Spas, whatever their situation and climate, are most crowded during July and August ; it is then that their most seductive garb is put on : length of days and warmth of weather are judiciously made the most of to invite and detain the traveller. Foreigners come to England, too, most frequently in the summer months ; visiting Bath, perhaps, precisely when she is most dull and quiet, and most bereft of those vivacities of movement which impart life and colour to a mineral Spa. Whatever may be the dictates of an arbitrary fashion, let us remember that the healing Water flows on all the year round ; and therefore the “season” for such Water is simply that time of the year in which its salutary powers are best appreciated and sustained.\*

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\* In Bath and similar places there are two elements to be considered—the residents and the visitors. It is natural and right

Cities and towns often cluster about a medicinal spring, and modify its social conditions and surroundings. The "Kursaal" in Germany and Switzerland bespeaks the craving of the individual for society and amusement.\* Under one roof or in one neighbourhood are the Orchestra, the Assembly Room, rooms for reading and for refreshment, and the Theatre. At a foreign resort of health and pleasure which I visited last summer (1876) a band played three times a day in a covered orchestra ; opposite this was a crescent-shaped arcade where light repasts were served, and which was crowded every evening ; behind were apartments for public and private recreation ; and in the centre was a commodious Theatre, in which a drama was performed three or four times a week. The climate of our country and the habits of our people compel greater seclusion ; and in Bath there are advantages

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that the residents in a "winter place" should flee from it in the summer ; but my argument is that the customs and inclinations of the residents should not necessarily be a pattern for the conduct of the Spa. The beauty and variety of the country in this corner of Somerset are to be enjoyed chiefly in spring and early summer ; and evidence will be adduced by and by to show that for more than a century Bath was most resorted to by invalids during the early summer months.

\* At Interlaken (Switzerland) a "Kurhaustaxe" is levied on every visitor at the hotels, and this confers a right to all the privileges of the "Kursaal" (except the Theatre).



from the Assembly Rooms being in one part of the city, the Theatre in another, and both being separated from the proper business of the Spa.

Acknowledging the generally satisfactory control of the Grand Pump Room and baths, and the trouble and time bestowed on the many details of daily management, there are a few minor matters in which we have not advanced since Dr. Granville's days. From November to April the band might perform for an hour every afternoon in the Pump Room, a better plan than a two-hours' performance on alternate days. If we are not strong enough to maintain a public gallery of pictures (few attractions are more soothing and refining), the bare walls of the Pump Room might be adorned with contributions from local and other artists, to be changed from time to time as in other exhibitions ; and if the structural decorations of the walls forbid pictures to be affixed to them, screens might be put up in the eastern and western recesses (though in neither case would the light be favourable). I am told that many years ago there were groups of sculpture in the Pump Room, and surely there is space for a few now. Some flowers might be introduced with good effect, and with a little architectural *finesse* could not a small conservatory be made at the south-eastern corner of the Pump Room, corresponding with the corridor which leads

to the King's and Queen's baths at the other end ? I venture these suggestions to help in driving away that demon of dulness which infests so many health-resorts, and which wonderfully depresses the most hopeful convalescent. There are always strangers—sometimes unfriendly strangers—among us, judging us by what they see and hear. There is quite enough bustle in the squares and streets of Bath to vindicate us from the charge of stagnation, and the citizens have only to realise what a healing fountain is at their doors that they may heartily uphold the good repute of England's great Thermal Springs.

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In the general literature of the early part of the last century, our city was spoken of sometimes as "Bath," at other times as "the Bath." In a letter from Mr. Cromwell to Pope, dated October 16th, 1711, the writer says at the beginning, "Mr. Wycherley visited me at Bath in my sickness ;" and a little further on he continues, "He went to Gloucester on his way to Salop, but was disappointed of a boat, and so returned to the Bath." To a lady Pope writes (1714) about her sister, "Ratcliffe orders her to Bath, and she refuses ! . . . You let me tell her she will never look so finely while she is upon earth, as she would here in the Water. She does not make half so good a figure on horse-

back as Christina Queen of Sweden ; but were she once seen in the Bath, no man would part with her for the best mermaid in Christendom." "Doctor Arbuthnot is going to Bath," writes Mr. Digby to Pope, on September 1st, 1722 ; and " his brother, who is lately come into England, goes also to the Bath," is another sentence which occurs in the same letter. This and other points are illustrated by two gay and pleasant papers in the *Tatler* and in the *Guardian*.

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"The Tatler."

No. 16. *Tuesday, May 17, 1709.*

WHITE'S CHOCOLATE HOUSE,  
MAY 15.

Sir Thomas, of this house, has showed me some letters from the Bath, which give accounts of what passes among the good company of that place, and allowed me to transcribe one of them, that seems to be writ by some of Sir Thomas's particular acquaintance, and is as follows :—

"DEAR KNIGHT,—I desire that you would give my humble service to all our friends, which I speak of to you (out of method) in the very beginning of my epistle, lest the present disorders, by which this seat of gallantry and pleasure is torn to pieces, should make me forget it. You keep so good company, that you know Bath is stocked with such as come hither to be relieved from

luxuriant health, or imaginary sickness; and consequently is always as well stowed with gallants, as invalids, who live together in a very good understanding. But the season is so early, that our fine company is not yet arrived; and the warm bath, which in heathen times was dedicated to Venus, is now used only by such as really want it for health's sake. There are, however, a good many strangers, among whom are two ambitious ladies, who being both in the autumn of their life, take the opportunity of placing themselves at the head of such as we are, before the Chloe's, Clarissa's, and Pastorella's come down. One of these two is excessively in pain, that the ugly being, called Time, will make wrinkles in spite of the lead forehead-cloth: and therefore hides, with the gaiety of her hair, the volubility of her tongue, and quickness of her motion, the injuries which it has done her. The other lady is but two years behind her in life, and dreads as much being laid aside as the former; and consequently has taken the necessary precautions to prevent her reign over us. But she is very discreet, and wonderfully turned for ambition, being never apparently transported either with affection or malice. Thus, while Florimel is talking in public, and spreading her graces in assemblies, to gain a popular dominion over our diversions, Prudentia visits very cunningly all the lame, the splenetic, and the superannuated, who have their distinct classes of followers and friends. Among these she has found, that somebody has sent down printed certificates of Florimel's age, which she has read and distributed to this unjoyful set of people, who were always enemies to those in possession of the good opinion of the company. This unprovoked injury done by Prudentia was the first occasion of our fatal divisions here, and a declaration of war between these rivals. Florimel has abundance of wit, which she has lavished in decrying Prudentia, and giving defiance to her little arts. For an instance of her superior power, she bespoke the play of Alexander the Great, to be acted by the company of strollers, and desired us all

to be there on Thursday last. When she spoke to me to come, As you are, said she, a lover, you will not fail the Death of Alexander ; the passion of love is wonderfully hit—Statira ! Oh, that happy woman—to have a conqueror at her feet—but you will be sure to be there. I, and several others, resolved to be of her party. But see the irresistible strength of that unsuspected creature, a silent woman. Prudentia had counterplotted us, and had bespoke on the same evening the puppet show of The Creation of the World. She had engaged everybody to be there ; and to turn our leader into ridicule, had secretly let them know, that the puppet Eve was made the most like Florimel that ever was seen. On Thursday morning the puppet-drummer, Adam and Eve, and several others who lived before the flood, passed through the streets on horseback, to invite us all to the pastime, and the representation of such things as we all knew to be true ; and Mr. Mayor was so wise, as to prefer these innocent people the puppets, who, he said, were to represent Christians, before the wicked players, who were to shew Alexander, a heathen philosopher. To be short, this Prudentia had so laid it, that at ten of the clock footmen were sent to take places at the puppet show, and all we of Florimel's party were to be out of fashion, or desert her. We chose the latter. All the world crowded to Prudentia's house, because it was given out, nobody could get in.

When we came to Noah's flood in the show, Punch and his wife were introduced dancing in the ark. An honest plain friend of Florimel's, but a critic withal, rose up in the midst of the representation, and made many very good exceptions to the drama itself ; and told us, that it was against all morality, as well as rules of the stage, that Punch should be in jest in the deluge, or indeed that he should appear at all. This was certainly a just remark, and I thought to second him ; but he was hissed by Prudentia's party : upon which really, Sir Thomas, we, who were his friends, hissed him too. Old Mrs. Petulant desired both her daughters to

mind the moral ; then whispered Mrs. Mayoress, 'This is very proper for young people to see.' Punch at the end of the play made Madam Prudentia a compliment, and was very civil to the whole company, making bows until his buttons touched the ground. All was carried triumphantly against our party. In the mean time Florimel went to the tragedy, dressed as fine as hands could make her, in hopes to see Prudentia pine away with envy. Instead of that, she sat a full hour alone, and at last was entertained with this whole relation from Statira, who wiped her eyes with her tragical-cut handkerchief, and lamented the ignorance of the quality. Florimel was stung with this affront, and the next day bespoke the puppet show. Prudentia, insolent with power, bespoke Alexander. The whole company came then to Alexander. Madam Petulant desired her daughters to mind the moral, and believe no man's fair words ; 'For you will see, children,' said she, 'these soldiers are never to be depended upon ; they are sometimes here, sometimes there.' — Do not you see, daughter Betty, Colonel Clod, our next neighbour in the country, pull off his hat to you ? Court'sy, good child, his estate is just by us. Florimel was now mortified down to Prudentia's humour ; and Prudentia exalted into hers. This was observed ; Florimel invites us to the play a second time, Prudentia to the show. See the uncertainty of human affairs ! the beaux, the wits, the gamesters, the prudes, the coquettes, the valetudinarians and gallants, all now wait upon Florimel.

Such is the state of things at this present date ; and if there happens any new commotions, you shall have immediate advice from

Sir,

Bath, May 11, 1709.

Your affectionate friend and servant."

“ *The Guardian.* ”

*No. 174. Wednesday, September 30, 1713.*

Salve Pœniæ largitor nobilis undæ,  
 Salve Dardanii gloria magna soli ;  
 Publica morborum requies, commune medentum  
 Auxilium, præsens numen, inempta salus.

*Claudian.*

In publick Assemblies there are generally some envious splenetick People, who having no Merit to procure Respect, are ever finding Fault with those who distinguish themselves. This happens more frequently at those Places, where this Season of the Year calls Persons of both Sexes together for their Health. I have had Rheams of Letters from *Bath, Epsom, Tunbridge*, and *St. Wenefride's Well* ; wherein I could observe that a Concern for Honour and Virtue proceeded from the want of Health, Beauty, or fine Petticoats. A Lady, who subscribes herself *Eudisia*, writes a bitter Invective against *Chloe* the celebrated Dancer ; but I have learned, that she herself is lame of the Rheumatism. Another, who hath been a Prude, ever since she had the Small-Pox, is very bitter against the Coquets ; and a sharp Wit hath sent me a Keen Epigram against the Gamesters ; but I took Notice, that it was not written upon gilt Paper.

Having had several strange Pieces of Intelligence from the *Bath* ; as, that more Constitutions were weakened there than repaired ; . . . with several other Common-place Strokes of Raillery ; I resolved to look upon the Company there, as I returned lately out of the country. It was a great Jest to see such

a grave ancient Person, as I am, in an embroidered Cap and Brocade Nightgown. But, besides the Necessity of complying with the Custom, by these Means I past undiscovered, and had a Pleasure, I much covet, of being alone in a Crowd. It was no little Satisfaction to me, to view the mixt Mass of all Ages and Dignities upon a Level, partaking of the same Benefits of Nature, and mingling in the same Diversions. I sometimes entertained myself, by observing what a large Quantity of Ground was hid under spreading Petticoats ; and what little Patches of Earth were covered by Creatures with Wigs and Hats, in Comparison to those Spaces that were distinguished by Flouncès, Fringes, and Fall-bulbows. From the Earth, my Fancy was diverted to the Water, where the Mixture of Men and Women hath given occasion to some Persons of light Imaginations, to compare the *Bath* to the Stream wherein *Diana* washed herself, when she bestowed Horus on Actæon. But by one of a serious Turn, these healthful Springs may rather be likened to the *Stygian* Waters, which made the Body invulnerable ; or to the River of *Lethe*, one Draught of which washed away all Pain and Anguish in a Moment.

As I have taken upon me a Name which ought to abound in Humanity, I shall make it my Business in this Paper, to cool and assuage those malignant Humours of Scandal which run throughout the Body of Men and Women there assembled ; and after the manner of those famous Waters, I will endeavour to wipe away all foul Aspersions, to restore Bloom and Vigour to decayed Reputations, and set injured Characters upon their Legs again. I shall herein regulate myself by the Example of that good Man, who used to talk with Charity of the greatest Villains ; nor was ever heard to speak with Rigor of any one, till he affirmed with Severity that *Nero* was a Wag.

After some biting sarcasms on the male and female gamesters who then infested Bath and



crowded around "Harrison's Table," the essayist proceeds :—

The *Water Poets* are an innocent Tribe, and deserve all the Encouragement I can give them. It would be barbarous to treat those Authors with Bitterness, who never write out of the *Season*, and whose Works are useful with the Waters. I made it my Care therefore to sweeten some sour Criticks who were sharp upon a few Sonnets, which, to speak in the language of the *Bath*, were mere *Alkalies*. . . . There are a hundred general Topicks put into Metre every Year, viz., *The Lover is inflamed in the Water*; or, *he finds his Death, where he sought his Cure*; or, *The Nymph feels her own Pain, without regarding her Lover's Torment*. These being for ever repeated, have at present a very good Effect; and a Physician assures me that *Laudanum* is almost out of Doors at the *Bath*.

The Physicians here are very numerous, but very good-natured. To these charitable Gentlemen I owe, that I was cured, in a Week's Time, of more Distempers than I ever had in my Life. They had almost killed me with their Humanity. A Learned Fellow-Lodger prescribed me *a little something*, at my first coming, to keep up my Spirits; and the next Morning I was so enlivened by another, as to have an Order to bleed for my Fever. I was proffered a Cure for the Scurvy by a third, and had a Recipe for the Dropsy *Gratis* before Night. In vain did I modestly decline these Favours; for I was awakened early in the Morning by an Apothecary, who brought me a Dose from one of my Well-wishers. I payed him, but withal told him severely, that I never took Physick. My Landlord hereupon took me for an *Italian* merchant, that suspected Poison; but the Apothecary, with more sagacity, guessed that I was certainly a Physician myself.

The Oppression of Civilities which I underwent from the sage Gentlemen of the *Faculty*, frightened me from making such

Enquiries into the Nature of these Springs, as would have furnished out a nobler Entertainment upon the *Bath*, than the loose Hints I have now thrown together. Every Man who hath received any Benefit there, ought, in proportion to his Abilities, to improve, adorn, or recommend it. A Prince should found Hospitals, the Noble and the Rich may diffuse their ample Charities, Mr. *Tompion*\* gave a Clock to the *Bath*, and I *Nestor Ironside* have dedicated a *Guardian*.

I pass from gay to grave, and refer to a little volume (scarce and precious) in the Chapman Library of the Bath Royal Literary and Scientific Institution, entitled "Prayers for the use of all persons who come to the Baths for cure. By the Author of the Manual of Prayers for the use of the Scholars of Winchester Colledge. London, printed for C. Brome, 1692." This "Author" was none

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\* This clock now stands in the eastern recess of the Grand Pump Room. It is probable that Mr. Tompion's name was used to designate clocks and watches generally, just as we designate a certain kind of carriage by the name of Brougham. This at least is the conclusion I draw from a passage which I discovered a short time ago in Pope's "Martinus Scriblerus, Of the Art in Sinking in Poetry." In chapter X., a specimen is given of the "Metonymy, the Inversion of Causes for Effects, of Inventors for Inventions, &c."

"Laced in her Cosins new appear'd the bride,  
A Bubble-boy and Tompion by her side."

"Cosins" meant stays; a "Bubble-Boy" meant a tweezer-case; and a "Tompion" meant a watch. All these words were in common use in 1727.

other than Thomas Ken, D.D., Bishop of Bath and Wells. The late Dr. Markland republished these "Prayers," with a brief life of the author, in 1849.\* The volume begins with the Invocation, "All Glory be to God." Then follows an address :—

"Good Christian Brother or Sister,—Whatever the Calamity be . . . which brings you to this place, I am sensible how tender a regard I ought to have for you, since you are come within my Fold, in imitation of our most merciful Redeemer, Who in respect even of our bodily distempers, Sympathised with our miseries, *bore our griefs, and carried our sorrows.* (Isaiah liii. 4. Matt. viii. 17.)

"For this reason I could not satisfy myself in only praying for you, as I daily do, unless I did also send you these Directions and Prayers, which are few and short, and familiar, to comply with the infirmities of your Condition, and which I hope by GOD'S blessing may be *words spoken in season* ; nor can I doubt but that all of you who want such helps, will seriously peruse them, and

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\* Bishop Ken exhorts all who come to the baths for cure to "daily frequent the public prayers, or as often as their infirmity permits." Dr. Markland reminds his readers that the opportunities for daily prayer are offered at the Abbey Church, and at a small chapel erected near the source of one of the springs and attached to the ancient Hospital of St. John the Baptist. To which may be added now the two churches of Bathwick. Dr. Peirce tells us that the Rector of the Abbey in his day inserted a petition in that Collect in which the sick and the infirm are prayed for, that the Waters may be made beneficial to all who use them. Dr. Peirce probably alluded to a petition in the Litany.

observe the advices of your spiritual Physicians, as you are wont to do those of your Corporal.

“Do not think the Baths can do you any good without GOD’S immediate blessing on them ; for it is GOD that must first *heal the waters* before they can have any virtue to heal you.

“The River Jordan could never have cleansed Naaman of his Leprosy, had he washed himself in it seventy times seven times, had not GOD blessed it to his cleansing. The Pool of Siloam (John ix. 7) could never have restored sight to one born blind, had not our Lord sent him to it. And the Pool of Bethesda could never have made sick persons whole, but that an Angel was sent by GOD to *trouble the Waters* (John v. 4).

“I cannot then do better than to send you to that Angel, who, according to St. John, Flies in the midst of Heaven, having the everlasting Gospel to preach to them that dwell on the earth, saying with a loud voice, fear GOD, and give glory to Him ; and worship Him that made heaven, and earth, and the Sea, and the fountains of waters (Rev. xiv. 6, 7).

“This was the Angel’s Sermon ; and I beseech you to become his Auditors,\* and to observe how after the Heaven and the Earth and the Sea, he particularly mentions the Springs or Fountains of Waters as a very wonderful part of the Creation ; for out of the dark places of the Earth, through Passages and from Causes unknown to the search of the wisest of men, GOD makes sweet and fresh springs to rise, to water the Earth, to give drink to every Beast of the Field, and to supply all the necessities of human Life ; and Springs of different kinds, some to allay our thirst, some to Cure our Diseases.

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\* Dr. Markland changes this word in his edition into “hearers ;” apparently forgetting the archaic dignity of “auditors,” and its former wider meaning in accordance with its etymology. Sir Philip Sidney and Shakspeare might be quoted *ad rem*.

136 SOME ACCOUNT OF THE BATHS OF BATH :

“Look therefore on the Bath as a very admirable and propitious Work of Divine Providence, designed for the good of a great number of infirm persons, as well as yourself. Praise and adore GOD, Who has signally manifested His Power and His Mercy in Creating so Universal a good ; and the first thing you do when you are come to this place, *worship GOD Who made the Fountain.*

“To this end you may use the following at your first coming, and all the time of your stay : and be pleased to observe that this and all the other forms which you find here, are penned in distinct parts, on purpose that you may choose those which are most suitable to your condition, or recite one at a time, if your weakness will not bear any longer intention of your mind.

“A Thanksgiving for the Waters, and a Prayer for GOD'S Blessing on them. With all Humility of soul and of body, I praise, and adore, and worship Thee, O LORD GOD, All-mighty, and All-Gracious, *Who hast made the Fountains of Waters, Thou sendest the Springs into the Valleys which run among the Hills :* some for our Refreshment, some for Medicine, and in particular Thou hast sent us this Spring as a general good to infirm persons. And therefore all Glory be to Thee.

“Thee only, O LORD, do I acknowledge the Author of the Spring. Thou only canst make it effectual to my Cure, in Thee only I trust, on Thee only I depend, to Thee only I commit myself, all my hope is only in Thee.

“Behold, O merciful LORD, I am come to the Bath, as Naaman to Jordan. O may I feel the like happy effect, *O may I wash and be healed !*

“I come, LORD, like the blind man to the Pool of Siloam ; I come for Thou Thyself hast sent me, as Thou didst send him. Thy Providence, by laying on me this Distemper, has bid me come hither. O may the Bath be as powerful to restore my Health as the Pool was to give the blind man his sight.

"I come, LORD, to the Bath, like the Infirm man to the Pool of Bethesda ; O send Thy Angel to move the Waters as I step into them, to move them not only for me, but for all other Infirm persons also whom Thou hast sent hither, that *we may be made Whole of whatsoever Diseases we have*, if it seem good in Thy sight.

"LORD, be Thou pleased to guide and counsel my Physician, that he may thoroughly discover the cause of my Distemper, and prescribe proper means for my Recovery ; and do Thou so bless those means, that in Thy good time they may become successful.

"O my GOD, hear me and help me, for the merits of JESUS Thy beloved. Amen."

Then follow sundry "Prayers" and "Exhortations :"—an Exhortation to the Rich, and a Prayer for the Rich ; an Exhortation to the Poor, and a Prayer for the Poor. There is the Poor Man's Prayer for those that relieve him, and there are Ejaculations for the Poor. Ejaculations for the Afflicted and a Thanksgiving conclude the volume, which has many devotional touches reminding us of Bishop Andrewes and Bishop Wilson.

## CHAPTER IV.

## THERAPEUTICS OF THE BATH THERMAL WATERS.

I come now to the principal subject of this volume—the medical value of the Bath Thermal Waters.

The scientific use of Mineral Waters is a subject on which (it must be confessed) we are as yet only on the threshold. Much mystery and no small empiricism have been thrown over the subject. The therapeutic story of the Bath Thermal Waters is only three hundred years old. During the eighteenth century the literature of these Waters was large, and the interest among all ranks of people was very great. Curiosity sought even then an exact and reasonable basis ; experience was asked for, and statistics collected ; and chemical analysis was constantly appealed to for an explanation of the healing powers. Dr. Baylies says that when he came to Bath (1757), it was his first business to gather from writers an accurate account of the good and bad effect of the Bath Waters in different

diseases ; and the result of this was confirmed or corrected by his own enquiries. Many of the older medical writers were distinguished for fidelity of observation and clearness of narrative ; they were earnest seekers after truth and were never weary of the search. It is impossible to praise too highly the large body of selected cases portrayed by Peirce, Guidott, and Sutherland. Illness and weakness and deformity were depicted with vivid force, nor were shades of disposition and character beyond their notice. It is this quiet accumulation of material by careful and unbiassed hands which makes our task to-day so much more easy. Not only are there stores of experience ready for our use, but the ways and means of acquiring more are provided and endowed.

I have no intention, *more Francorum Germanorumque*, of going back to the beginning of the world for illustrations of the science and art of bathing. Encyclopædic knowledge can be easily got from encyclopædic sources. From the Old Testament we learn the ablutions practised by the ancient Hebrews, and from Homer the ablutions of the Greeks. Dr. Friend states that the Egyptians were so fond of hot bathing for cleanliness and health, that when Alexandria was plundered in the seventh century four thousand baths were found there. In various ancient and modern authorities there are



accounts of the bathing customs of the Arabians, Persians, and Hindoos. Of most interest to ourselves are the superb relics of the Roman baths, and the manner in which they exemplify what may be properly called the balneology of the Roman people. With them it was a "popular passion." Dean Merivale, in the work already quoted, speaks of their "universal appetite for the bath, a refreshment which degenerated, in their immoderate use of it, into an enervating luxury. The houses of the opulent were always furnished with chambers for this purpose ; they had their warm and cold baths, as well as their steam apparatus ; and the application of oil and perfumes was equally universal among them. From the earliest times there were perhaps places of more general resort, where the plebeian paid a trifling sum for the enjoyment of this luxury ; and among other ways of courting popular favour was that of subsidising the owners of these common baths, and giving the people the free use of them for one or more days. Besides the erection of lesser baths to the number of a hundred and seventy, Agrippa was the first to construct public establishments of this kind, or *Thermæ*, in which the citizens might assemble in large numbers, and combine the pleasure of purification with the exercise of gymnastic sports ; while at the same time they might be amused by

the contemplation of paintings and sculptures, and by listening to song and music.”\* Such were the amusements of the great mass of the citizens—amusements which had become serious occupations.

Hippocrates was the first physician who applied baths to medical uses ; and in the writings ascribed to him baths are mentioned and their effects described. Pliny says that hot natural baths were frequently employed in Italy. In the third chapter of the first book of Celsus *De Re Medicâ*, there are excellent directions for bathing, and the conditions for practising it are minutely specified. The technical words *solium* and *tepidarium* are used, and the functions of anointing and shampooing were essential parts of the bathing discipline. Physiological science was then unable to explain the vital results of these artificial processes ; but the benefit was clear in the renewal of health and strength. There was no distinct line of usage between the bath of health and the bath of luxury : but it is evident that the more often a warm bath is resorted to for purposes of luxury, the less efficacious must it be as an instrument of health.† The scientific application of Mineral Waters is a thing only of

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\* Op. cit. (Cabinet Edition), vol. v., p. 77.

† As Lord Bacon says : “ If you make physic too familiar, it will work no extraordinary effect when sickness cometh.” (Essay 30.)

yesterday. A real science of Balneology could not be founded "so long as the elementary processes of the operation of Water were not investigated." But Water, as furnished by Nature, is never absolutely pure: and the more there are of foreign substances in it, and the greater their quantity, the nearer it approaches the character of a medicine. A Water ceases to be potable when from an alien taste or an unusual organic effect it cannot be taken as a dietetic beverage: and of course there is a borderland in which a thing may be dietetic or medicinal according to the circumstances in which it is used. Establish, then, a Water as medicinal, and it becomes a subject of medical enquiry; what is it good for, and what work are we to do with it?

Backwardness in giving definite answers to these questions has arisen from the long defective state of chemical analysis. Dr. Braun reminds us that a true qualitative and quantitative determination of the ingredients in Mineral Waters did not exist before the third decade of this century, and was first due to the labours of Berzelius and Struve. Hence there could be no scientific basis for the use of baths, and for the drinking of Waters. When it is remembered that only a little more than a hundred years have elapsed since the discovery of the composition of water and of atmospheric air, it

will cause less surprise to know that the commonest saline compounds and gases were defined only a short time before. In no subject was mediæval speculation more dominant than in chemical dynamics ; for all effects were supposed to be owing to the shape of ultimate particles, and the shadow of alchemy chilled original research. Animal physiology was in the same crude condition, inasmuch as the most elementary vital processes were imperfectly understood. During the last forty years so much has been done, that it amounts to "far more than all preceding centuries had produced:" and although we have advanced but a few steps, it may be asserted that a solid foundation has been laid for a complete scheme of Balneotherapy, or Balneotherapeutics.

The account which has been given of the physical and chemical constitution of the Bath Thermal Waters prepares the way for our medical chapter. Technically, the Bath Waters are called "hot," because their temperature at the fountain-head is above 100 degrees ; but they are commonly used (in the first instance, at the very least) as "warm" baths, the temperature of which means blood-heat, and a small range above and below it. The term "indifferent thermal spring" is applied by balneologists to the Bath Waters, because warmth is their principal dynamic power, although the tem-

perature may be beneficially modified or supplemented by other agents. Of these, the nitrogen gas and the saline material are the chief. This is a short physical and chemical summary of the Bath Waters, so far as their therapeutic virtue is concerned. To consider their application under the heads of Medical and Surgical uses would be according to professional tradition : but not to dwell on the fact that Medicine and Surgery constantly cross each other's bounds, there is obviously a more methodical plan. A Mineral Water may be drunk as a medicine, or may be employed for medicinal bathing ; hence the natural distinctions of internal and external use classify themselves without difficulty. And, forasmuch as a long and venerable antiquity can be quoted for the doctrine of bathing, and its effects have been observed and studied for many generations, I propose to discuss first

(A.) THE EXTERNAL USE OF THE BATH  
THERMAL WATERS.

A few preliminary words are necessary on the physiological action of a warm bath.

The warm bath increases the heat of the body, partly by direct supply and partly by diminished radiation and evaporation. Just as cold produces more or less congestion of the internal organs, so

contrariwise moist warmth draws the blood from those organs to the external parts. An increased oxidation takes place simply from the physical cause of the greater heat of the blood. As Dr. Braun puts it—"cold refreshes by stimulating the functions, heat by physically facilitating them: and in this lies the important practical difference between the cold-water system and the thermal method of treatment." And from these facts Dr. Braun deduces some axioms on the vital effects of the warm bath (I quote Dr. Braun's words, as I can neither alter nor improve them): (*a*) "the warm bath, during its duration and so long as its primary effects continue, favours by means of the physically-increased degree of heat, the normal, physical, and chemical condition of the cells, juices, and organic tissues. (*b*) By this means it is possible to stimulate the organic functions and to increase the change of substance without demanding a strong reaction, but by merely facilitating the physical conditions of life. (*c*) Whilst the warm bath lessens the loss of heat, it undertakes the normal compensating reaction: and whilst it surrounds the skin with an equable temperate medium, it frees the loss of heat from all variations of time and place, and produces a quieting effect. (*d*) The circulation of the blood in the skin and in the parts accessible to the heat, is accelerated just as by the cold bath, although the

mechanical process is different. (*e*) Greater degrees of heat produce a stimulating effect, it is true, upon the heart and brain ; but this effect is gentle and is not accompanied with any shock ; and, moreover, the congestion in the peripheric parts draws away the blood from the central organs of the circulation and nervous system. (*f*) In addition to all this, there is the well-known property of warm water of rendering the skin softer, and of purifying it more rapidly ; which, however, is likewise the case with those forms of the cold bath which excite great perspiration. And, lastly, we may mention the perspiration-exciting effect of very warm or moderately warm baths, succeeded by warm covering in bed, which produce the same lixiviating result as that aimed at in the perspiration of the cold-water system. (*g*) The warm bath promotes absorption, partly by stimulating the nervous centre, and partly by increasing the circulation and pressure of the blood, and by distending the vessels.”\* From this clear and judicial statement the inference seems fair that the cold-water system pre-supposes a certain soundness of the organic functions, and a certain amount of capability : and that the warm-water system does not make so strong a demand upon the natural active power of

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\* “ On the Curative Effects of Baths and Waters,” by Dr. Julius Braun. Translated, with notes, by Dr. Weber. See pp. 126, 127.

the organism. Another important physiological question may be asked—can urea, or products which, if properly oxidised, would form urea, pass off by the skin? It is doubtful if warm baths can effect this stimulation: as it seems to be almost certain that in health no nitrogenous substance finds its way from the blood through the skin. The skin is a vast secreting and excreting gland: but its own functions are so complex that it cannot readily undertake the duties of any other organ.

Such is a sketch of the ideal warm bath and its vital influences. Next we have to consider how the constituents of a Mineral Water may modify its other physical qualities. In pharmaceutical language, the Bath Thermal Water might be termed a warm alkaline lotion. The body is assisted by its “friendly warmth,” says one physician; it is a “sovereign remedy,” writes another; and all testify to its “diluting, cleansing, and correcting” properties. In opposition to the cold water theories of his day, Dr. Peirce maintained that hot mineral Waters can do all the work of cold waters, and something more: for they “alter all saltiness, sharpness, and sourness of blood and nervous juice: they are useful in cachectic and scorbutic habits: and they benefit colic pains, rheumatisms, gout, and eruptions of the skin.” The bath, like the Sun, says Dr. Guidott, “works according to



the capability of the subject, relieves the weary, strengthens the weak, and discusseth when it meets with discussable matter." One remarkable quality in a natural thermal Water is that it rouses and sustains the cutaneous circulation by reason of its stimulating qualities. This result is at least partly due to bulk of fluid, which permits the bather to move about or to swim in it; the play of muscle and the friction of the warm medium cause a free activity of the sudoriparous glands. Hence what are called water-packing and soaking in the largest bath of domestic use, are essentially different processes; while the saline matter raises the specific gravity of the Water, and makes it therefore a better conductor of heat.\* With much good sense it was said by Sir Arthur Clark (at the beginning of this century), that "people appear to be deterred from having recourse to the [natural] warm bath in the day-time for fear of afterwards catching cold. This opinion . . . . has been derived from observing that persons are liable to injury from exposing themselves to cold air after having been

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\* Dr. Weber remarks that the great advantage of the thermal Spas compared with other establishments in which artificially warmed baths are taken, consists in the fact that, by the large quantities of hot Water stored in the bathing establishments of the thermal Spas, the passages and bathing rooms are constantly warmed.

heated and fatigued by exercise ; but the state of the body, after having been in the warm bath, is very different. In the one case the body, debilitated by fatigue, is parting with its heat rapidly by increased perspiration, continually vaporating, and generating cold on the surface of the body. In the other case, being surrounded by a medium of nearly its own temperature, the heat of the system is prevented from escaping, and has rather a tendency to accumulate. By this means the body is better able to resist the action of cold immediately after coming out of a warm bath than perhaps in any other given situation.”\* It may be added that while it is easy to appreciate the total effects of heat, fluidity, and inorganic contents, it is a problem of the highest difficulty to isolate the separate effects of each factor. We must not forget, too, the absorbent power of the skin, so that when the body is immersed in a compound fluid some of the material dissolved in it must be taken into the system.

One of the most interesting traditions of Bath as it was in the last century concerns the medical

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\* Immersion in a *hot* bath is quite a different thing, and requires special precautions. Moist heat causes congestion of the skin, the intensity of which may approach stagnation ; and this implies a depression of nerve-power, which may render the bather unable to resist subsequent cold.

profession. London doctors were (as a rule) not at all on friendly terms with Bath doctors, and somewhat less than two hundred years ago sick people were in every way hindered from coming to Bath. About 1750 or 1760 twenty physicians (at least) practised here during the "season;" besides more than thirty apothecaries who resided here, many of whom made fortunes (said Dr. Lucas) without "dealing in the Bath Waters." There were not a few "chirurgeons," too, of whom some were "occasionally of any or all the other branches." The wits exclaimed that at all events there would be plenty of solace for the crippled and impotent folk, even if the Waters were suddenly to be dried up! And what rivalries were begotten may be judged from the fact that one (Dr. Baylies) of the medical craft uttered the bitter lamentation—"What a number of physicians! How exorbitant their fees, and how infinite their prescriptions! Can all this be necessary? Can the health and welfare of the public require such multitudes?" Well, public opinion in those days adhered to two rules:—firstly, that every patient ought to bring to Bath an "historical deduction of his (or her) case," or, in other words, an account of the nature of the malady; and secondly, the medical adviser at the baths was called a "director," without whose advice and sanction nothing was done. The credit of any

medicine was rightly held to dépend as much upon the "skill of the director as upon the virtues of the remedy;" and the use of the baths was no exception to this rule.\* To the "judicial or ministerial" exercise of medical art much homage was paid one and two centuries ago. And for the right application of bathing two qualifications were held to be necessary—the director was expected to have a physical and experimental knowledge of the bath, and to be master of the disease for which it was employed. Of those who came to Bath and declined to have a "director," Dr. Peirce said, "Let such look to themselves; we are not accountable for them, and if they are not recovered, or (as is the case with many) have injury by it, 'tis not to be imputed to the baths or Waters, no more than a madman's cutting his throat is to be imputed to the knife or the cutler that made it."

When the sick man had chosen his director, the latter was expected to wait upon his client at the bath and watch its effects. Dr. Sutherland (1763) unkindly charged the faculty of the city with the quackishness of promising to cure everybody of everything by means of the Waters; but the doctors at one Spa were perhaps no worse than those of any

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\* The unamiable Dr. Baynard wrote :—"Good luck to the patient if he lights upon a director who can distinguish a kettle-drum from a cart-wheel!"

other. Each bath was imagined to possess distinct healing virtues ; still, so far was there from being precise agreement as to what these virtues were, that a small clique or coterie would be formed for the purpose of magnifying a particular spring, and proclaiming its reputation to the world. In one fashionable circle the name of the King's bath was a mighty enchanter ; among another set the Hot bath was affirmed to cure everyone ; and not a few might swear by the Cross bath as the real magical pool. These pedantic contentions were the whims of folly and fancy, but were conducted with an imposing air of seriousness. For private reasons the physicians favoured one spring or another ; it might be because certain baths were nearer *this* physician's residence, or because *that* physician usually had all the patients who lodged in a special quarter of the town. As the Water of the Hot and King's baths has a stronger chalybeate and saline impregnation, and the Cross bath has more earthy contents, Warner relates that in his time the spring of the Cross bath was regarded as the least stimulant of any ; and therefore it was generally employed at the beginning of a course of treatment, or when there were doubts of the propriety of a hydro-therapeutic treatment at all. Dr. Baylies (1757) urged that the choice of baths was a point of the utmost consequence to the sick, and that the

Hot bath might be dangerous when the Cross bath might be even beneficial. Wood fell into the humour of the day so far as to lament that the patients of the Mineral Water Hospital were not allowed to bathe in all the springs; "it being a truth incontrovertible," he added, "that the Water of one bath is improper for that disease which the Water of another bath absolutely cures. And therefore without the use of the other baths several patients will be liable to be sent from the Hospital as incurable, without so much as trying the effects of our sovereign Waters." Such therapeutic distinctions are not justified by recent chemical analysis, and are practically disregarded by modern physicians.

The patient may be supposed now to have reached the city, to have chosen his medical director, and to be waiting for instructions. Had the time for bathing come? By no means. The discipline of Preparation must be gone through, and there was no medical precept of old times more exacting. The senior doctors were peremptory on this point, and "Young Physic" was quite as eager for a custom so favourable to professional aggrandisement. Dr. Guidott declared that it was very necessary for the body to be well prepared before the Waters were taken or bathed in; and "this preparation must be made, not slightly with a little Bath Water

and salt, syrup of roses, manna, and such like alimentary medicines, but with proper, effectual, and frequent purgations, or otherwise a whole 'iliad of evils' may be caused." Dr. Peirce was sure that "if there were no preparation the humours would be heated, dilated, and exasperated." Bleeding (something copious) was commonly a part of this preparatory regimen, and no function gave the apothecaries higher delight. If the Waters did no good, the patient was told that the "preparation" had been insufficient; and if real harm were caused, the same consolation was applied in a larger degree. Youth and age, male and female, obeyed a rule not always tenderly exercised, and which varied in an arbitrary way according to the medical man who was consulted. Sometimes the doctor who sent a refractory client to Bath was blamed for not previously carrying out the full doctrine of "preparation." Thus Dr. Peirce relates the case of a person who did not get better, and therefore it was settled at a complete consultation (termed "complete" when three physicians met) that he had not been properly prepared before leaving home; and so he was "by joint consent" submitted to a "sharp clyster, bleeding, vesications, vomiting, and smart purging." To which salivation was proposed to be added by the "gentleman from London (so great an influence hath a London physician upon us poor

mortals that practise physic in the country); but the unhappy patient died even before the whole of the other regimen had been practised upon him." We are reminded of the seat of the oracle of Trophonius, who delivered his responses to enquirers in the hall of a dark subterranean cave, whither the worshippers had descended after having undergone a rigid discipline of religious preparation, and where strange sights and mysterious voices made them fit objects for the reception of the oracular influence.

The hugest caricature of a thing has some truth at the root of it, and underneath the quaint practice described in the last paragraph we may discover a valuable lesson. The medical men of those days thought much (and rightly) of the constitution and habits of a patient, testing them in various ways to prove their quality and power of resistance. If everything promised well, the patient was humorously called a "Bath case." If there were any reasonable doubt whether the full bath would agree, the "case" was made to have a supply of the Thermal Water in his own chamber, and soak his feet and legs in it first. The experiment was then fairly tried, often with anxiety to the physician, whether the immersion of the whole body could be borne. Tumult of head and agitation of heart were looked for; and possibly disturbing thoughts were put into the patient's mind almost sufficient to cause the evils



that had to be guarded against. Uncomfortable feelings were, as usual, ascribed to inadequate preparation; but Dr. Sutherland suggested that these symptoms ought mostly to be attributed to an improper method of bathing. "The wholesomest things," said he, "may be converted into poisons" by want of skill; and so the doctor encouraged the sick by telling them that repeated trials would act safely, surely, and pleasantly. It was a prudent axiom of Galen's never to order bathing for a person who had a natural dread of it. Another opinion carefully handed down from the days of Baccius was that natural hot baths cannot be administered in "hot affections," as fevers and inflammations; but that most advantage was to be expected by "cold constitutions and members." Every act of bathing was supposed to create a fever of some sort, which ought to be allowed time for perfecting its own crisis; thus so great a disturbance in the system is sometimes caused by the operation of the Carlsbad Water, that the name of "Bad Sturm" has been given to it. This succession of crises is specific to each Mineral Water, and requires to be thoroughly understood and carefully watched. Dr. Sutherland drew attention to the fact in vital physics that the pressure of water is 885 times greater than that of the atmosphere; and how could we wonder, therefore,

if the blood be now and then driven to the head, causing "headaches and apoplexies?"\* According to the theories of that age the motion of the constituent parts of the blood is considerably increased by the heat of a Thermal Water, and its viscidities are broken and resolved; and therefore in all instances in which there is an "irresolvable obstruction" (to use Dr. Baylies' words), a hot bath does harm "because it pushes against matter that will not yield to the impelling force, with a stronger impetus of circulation than the stretched and distended vessels will bear." Hence the general dogma that no one of "plethoric, gross, or full habit of body" should ever bathe in a hot mineral Water without distinct medical sanction; recollecting Sydenham's wise rule that the free bounty of Nature must not be turned to our harm, even if we have not learned to do good with it. The old rule, frequently quoted, was—"Nature is the physician, and Medicine her mate;" which meant that with patience we "should wait the motions of Nature, and observe what the *vis vitæ* is aiming to perform."

While some of the local magnates of the profession acknowledged themselves to be by no means sure

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\* Juvenal says that an old man who over-ate himself every day, and went straight into a hot bath, would very likely bring on apoplexy.

"Hinc subitæ mortes atque-intestata senectus." *Sat. I. v. 144.*

whether there were any difference between Bath Mineral Water and plain warm water, so far as external use is concerned, other observers recorded that bathing in the former did not cause faintness and relaxation: but that the bathers were particularly alert and vigorous afterwards, with a better appetite. To what was this due?—an “electrical ether animating the whole man,” or an absorption of chemical principles? Medical men of the present day can testify to the fact that a person who has just bathed in the Bath Waters generally feels warm for some time, and may express the sensation by saying—“It is like a blanket all over me,” or, “I have a hot glow for the rest of the day.” Dr. Granville writes that he has tried six or seven warm springs, and he finds that ordinary water raised to the same temperature does not cause the same effects. The Gastein spring at  $120^{\circ}$ , and the Wildbad at  $97^{\circ}$ , are (according to Dr. Granville) the very antipodes of common warm bathing. The first excites and agitates the nerves, even though, before it is used, it is allowed to cool down to the same degree as that of Wildbad. The latter soothes, softens, and tranquillises the whole frame, although it holds in solution a smaller quantity of saline ingredients. These results have been quoted as sure proofs of the reality of the action of Mineral Waters; an action which may be called “alterative”

if by this term we mean, not a mystery, but an actual alteration of bodily solids and fluids. Even the same spring does not always have the same influence, and it is clear that the subject cannot be dismissed with the mechanical formula that as "cold water hardens steel, therefore it must also harden and brace the body ; and as warm water softens catgut, parchment, and dried leather, it must soften and relax living animal fibre." The human body is itself a warm substance, and imparts heat to, no less than it receives heat from, the medium in which it is placed. And the most scientific balneologists are leaning to the view that the *differentia* of a Thermal Mineral bath may depend partly upon electrical currents, the development of which is helped by the gases which the spring contains. After all, therefore, the veteran authors who started quaint electrical theories were, perhaps, nearer the truth than their contemporaries were wont to imagine.

In no point is there a greater discrepancy between old practice and new than in the space of time allotted for bathing. The patient being deemed fit for the process, and the precautions specified above being attended to, it was a common thing to permit the bather to continue in the Water an hour, and even considerably more. Lady Wortley Montague says of the Turkish ladies that they go on bathing

for four or five hours together, and pass immediately from the bath to a cool apartment. At Pfeffers the custom was to stay from seven till twelve hours daily in the bath. At Baden the invalids used to be almost as fond of the Water, and Tissot mentions a bathing-place in the Valais where patients literally spent the greater part of their residence in bathing. At Landecke (in Silesia) people were warned not to remain longer in their baths than six hours at a time! On all which facts an amiable author remarks that it was not the hardy and the rigid who did these things; but the weakly, the delicate, and the nervous, who ought to have been melted down and dissolved in good earnest, but who nevertheless recovered health and strength! And the experiment goes on at the baths of Leuk even now. Here there are four public basins, each about a yard deep, and each capable of accommodating some fifty bathers with their small floating tables. On the first day the patient remains an hour in the Water, clothed in a long flannel gown; the duration being daily increased until it extends to four or five hours in the morning, and for a shorter period again in the afternoon.\* To come nearer home—the late Dr.

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\* Dr. Täuner tells us that about the twelfth day an erythematous rash or *poussée* appears over the body, with prickling sensations of heat and febrile symptoms. The duration of the bath is then gradually diminished by half an hour daily until the cure is complete (usually in 25 or 30 days).

Jacques, of Harrogate, said that visitors to this Spa frequently stayed in the warm bath from one to two hours every day for two or three months, without weakening the body or in any way injuring the constitution. However, on the score of simple economy of time these prolonged bathings were unnecessary, and must in some respects have been hurtful. Any person in absolute or comparative health can try the experiment of immersion in a natural hot spring for half an hour ; let the escape of steam be secured by proper ventilation and the ingress of fresh air be promoted ; but the bather will suffer more or less lassitude, which will soon become exhaustion and faintness. Such a use of a warm mineral Water cannot be called medicinal. But some of the older physicians were sufficiently sensible of the importance of "discreet management," because it was their legitimate boast that patients often felt most good from a course of bathing after their return home.\* At the present time and for some years past the following scheme of bathing has been usually pursued :—The temperature of the first bath should be not above 96

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\* Dr. Baylies says distinctly that great evils were produced by too protracted bathing : and enumerates headaches (even to a phrensy), anxiety and palpitation of heart, with faintings and swoonings.

degrees ; nor should it rise above blood-heat (98 degrees) during the whole time of the bath, which ought not to exceed 15 minutes. This may be lessened to ten and even five minutes in particular cases. In all subsequent bathings the temperature of the bath at entry ought not to be more than 98 degrees ; but the temperature which may be allowed during the bath will be determined by the strength of body and the nature of the disease, and in this matter the instructions of the medical adviser must be implicitly observed. The great internal viscera being sound (so far as can be verified) and the general health being moderately good, a sojourn of fifteen to twenty minutes in the bath may commonly be permitted ; but on no account should it be more than half an hour (unless for medical and special reasons). The patient leisurely undresses (there is always a fire in the dressing-room when the weather requires it) and descends gradually into the Water. He should move about as much as strength or infirmities enable ; or, if standing still, the arms may play backwards and forwards ; and in every private bath there are *sedilia* on which the bather may repose. There is (or ought to be) a thermometer, which may be consulted from time to time ; and, unless the bather have a superabundant store of physical energy, the heat of the Water should never ascend beyond 106 degrees. The temperature is

kept down by natural radiation,\* or by the admission of cooled Water (which can be regulated by the bather or an assistant); but if hot Water flows continuously the temperature of the bath tends gradually to rise. Provision is made for letting off superfluous Water, so that the bath never overflows. On leaving the bath the invalid should immediately re-enter the dressing-room, and the attendant will envelope him in a warm sheet (and sometimes again with a warm blanket): and these, with the heat just communicated by the bath to the surface of the body, so help to dry the body, that on slipping off the wrappings the patient is surprised to find the skin hardly moist at all. If it be considered desirable to promote perspiration, the patient, while covered with the sheet and one or more blankets, should lie on a couch for a quarter of an hour, and afterwards be gently rubbed. Before he dresses himself, there will be a fitting opportunity for shampooing, with or without medicated substances; or for the application of electricity; or for the use of any other local treatment which may have been ordered by the professional adviser.

It is usual not to dip the head into the Water; not that there is any danger in doing so,

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\* In a private bath the heat lessens at the rate of about a degree in a minute when the Water is still. The velocity of cooling is, of course, increased by motion, as when some one is bathing.



but it is inconvenient and generally unnecessary. The agile, healthy swimmer in the large tepid bath may, of course, do as he pleases. Formerly the invalid during his bath was often made to have cold wet cloths swathed around his head. One of the bath-chambers is provided with a crane and other apparatus by which a very infirm and helpless person can be lowered into the water, and then raised again. Occasionally it may be prudent for a private servant to wait in the dressing-room, with which there is a direct communication by a bell that a person can ring while in the bath ; and a servant should always come when dressing requires assistance. The forethought of the medical man will induce him to warn his patient (not in gloomy prophetic tones) that entrance into the bath may cause slight palpitation of the heart, or an uncomfortable feeling in the head : these feelings are nearly always transient, and may then be disregarded. In the absence of discoverable organic disease, it may be presumed that these troubles will not return ; they are due partly to the novelty of the bath, partly it may be to "nervousness," and possibly a little to atmospheric conditions. But in spite of all encouragement and assurance, sufficient discomfort is now and then caused by a single bath to prevent a patient from bathing again ; and we shall not make things better by calling the un-

pleasant sensations mere "fancies." Rather should we try to find out what produced those sensations, and offer such advice as may help to counteract them in the future. But if owing to constitutional peculiarities some irritability of circulation always arises from every act of bathing, no matter what precautions are observed, it will be a question for deliberation whether any risk to the body should be encountered for the sake of a purely local malady, which probably can be cured or made better by the exclusively local application of the Waters. We must remember that what is only disorder to-day may be disease to-morrow; and that if a patient be on the borderland between the two, a so-called functional disturbance may lead to structural and permanent mischief. That the medical men of the last century were fully alive to this point may be inferred from the clear statement of Dr. Baylies :—"As the natural effects [of bathing in the Bath Waters] are to invigorate the *Vis Vitæ*, and to accelerate the circulation of the blood, they must of consequence be in every distemper a medicine either beneficial or dangerous."\* The co-existence of positive organic disease is such an

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\* After pointing out the easy and advantageous application of the Bath Waters from their copious supply and nice regulation of temperature, Warner re-echoes the general opinion that the

important qualification, that the subject will be discussed at length bye and bye.

A healthy person who bathes for a few minutes in natural thermal Waters trots away with fresh and active step, and ejaculates his hearty agreement with the old writers who said that our mineral springs "alter and strengthen," "stimulate and invigorate." He walks briskly home or he takes a regulation march on the Parades; the appetite is sharpened, the circulation is quickened, and the nutritive changes are promoted. There need be no "male-diction of the cold Waters of Epsom and Tunbridge," as every natural gift of this sort has its medical uses; but it may be conceded (with Dr. Guidott) that hot baths have the advantage of cold baths during nine months out of twelve. A scheme of prudent management might be framed somewhat after the following manner. In cold damp weather it is advisable for all but the most robust to go directly home after a bath, with an additional piece of clothing. In cold dry weather a healthy person may walk a mile or so—never sauntering—before going home: and in either case it will be better not to leave the house during the remainder of the day. Hence in winter the invalid who requires exercise

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Waters are deleterious when there is "extraordinary fulness," a "general inflammatory state," and a "determination of blood to the chest or head, with increased action of blood-vessels."

in the open air should take it before his bath, which ought not to be later than two o'clock in the afternoon. In summer much more liberty may be allowed. The convalescent can walk or drive during the earlier hours of the day, and enjoy a bath during the latter part of the afternoon or in the evening ; or the arrangement can be reversed, provided that a short interval be spent in-doors. At no time of the year must precautions be neglected against the fluctuating thermometric and hygrometric conditions of the English climate. And those who are in trouble from general weakness or local infirmity are bound to make everything give way to the main object of their mission here, and to let no pleasure or business interfere with the punctual observance of medical instructions. Fatigue, or a "chill," or any works and worries which agitate the temper and occupy too much time, are so many blows aimed at a placid state of blood and nerves, and so many hindrances to a restitution of bodily vigour and tone. Further, it must not be forgotten that there are imperfections and delicacies of constitution which always demand unusual care ; and some of the diseases which are the bane of this country, such as rheumatism and its congeners, impart a susceptibility to changes of weather which is no slight misfortune. It is an old rule of the Mineral Water Hospital that patients

do not go into the open air on their bathing days ; and, although the restriction may not be intrinsically necessary in all cases, it is found to work well when we have to deal with the inmates of a large institution.\*

Now as to the time and frequency of bathing. The custom of a morning bath has many recommendations in its favour. Refreshed by sleep and the early meal, the system is better able to bear the toils of the bath and the little processes auxiliary thereto. Say that the breakfast is finished by half-past nine o'clock, the invalid may reach his bath about eleven. A little light nourishment should be taken immediately afterwards, if there be any sense of exhaustion ; and sometimes it is advisable to have food and wine at hand in the dressing-room. Otherwise, it will be safe to wait till the usual luncheon-hour. If the bath be deferred until the afternoon, the same interval must elapse after

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\* The gossips of Dr. Oliver's time used to repeat a fearful story in order to frighten rebellious patients, and all who were "giddy and unthinking."—Governor Fitz-William, one of the most robust, after having been in the bath, walked to Lyncombe one cold day. He returned with a pain in his side ; a pleurisy ensued, which was eased by copious bleedings ; but a peripneumony succeeded which eluded the power of Art. He fell a "martyr to foolhardiness."

During the summer patients often bathed before six in the morning, and were under no prohibition for the rest of the day.

luncheon as after breakfast. On no account should a patient bathe after too long fasting, or with a feeling of weariness after immoderate exercise. A healthy adult who bathes in the evening for the sake of comfort or luxury ought to have had an early dinner. Three times a week is the excellent prescription for frequency of bathing, which has been handed down from almost mediæval days. An exception, however, may be conceded to those persons who are pressed for time, and who often ask leave for a bath on two consecutive days in either the former or the latter part of the week. Those eager creatures who come and go, and imagine that there cannot be too much haste in trying to get back the old blessing of health, soon find the mistake of using the Waters too often. Even a plain warm bath every day would be a too overpowering discipline, and a mineral bath of equal temperature is much more decisive in its reactions. On the other hand, some sick people discover that a bath twice a week is as much as they can bear, or perhaps the trouble is more than they care to encounter. Allowance must be made for the emergencies of weather, a very cold term of which will interfere with the best intentions: and hindrances may arise from slight attacks of indisposition. In the case of children, some abatement should be made in the matters of temperature of the bath and

of its duration ; and no child under thirteen or fourteen years of age should be permitted to bathe alone.\*

A hundred years ago and more there were enormous difficulties and even dangers in coming to Bath ; and when these were successfully overcome, it was only natural that the traveller would like to stay here for a time. It was said again and again that patients came to Bath by their own "impotunity or the obstinacy of their complaint," and not by the "wish of their physicians." And yet (it was urged) how foolish to visit the springs as a "last resource ;" *obsta principiis* ! Dr. Peirce alleges about patients who come from a distance that their own necessities and the "niceties of their physicians" were often antagonistic : for "all methods and means are tried, and then they [the patients] are sent to the bath."† And what "great

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\* In the parish register of Bath is the following entry among the burials :—"1617, July 26, William Jorden, the sonne of Mr. Doct. Jorden: the said child, by lamentable mishappe, being drowned in the King's bath." Quoted in the "Connection of Bath with the Literature and Science of England," by the Rev. Joseph Hunter, F.S.A., p. 79.

† Dr. Peirce constantly complained that invalids were unwillingly permitted to go to Bath rather than actually sent here by their physicians. They came here, said he, "cloyed with physic." A story is told of the Dowager Lady Brooke, who had the advice of the most eminent and learned physicians about Town, and

recoveries," says the triumphant Peirce, "are obtained by the use of these Waters, even when great means and long methods of physic have failed." Now and then, however, when a man had to journey here by easy stages, stopping at different towns on the way, he was waylaid by sundry doctors and apothecaries, who swore that he was going to

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they had "held her in several courses of physic" without amendment. "Her own proposal to come to the Bath was not approved of by any of the fore-mentioned physicians, and fiercely declared against by one of them; so that when he saw her ladyship resolved upon it, he told her plainly it would kill her, and came to take a solemn leave of her, telling her ladyship he should never see her more: but since she would go, she should blame herself if what he prognosticated should come to pass; but withal sent a basket of medicines from his own apothecary, which held near a peck, of which her ladyship never took an ounce."

Dr. Peirce was much esteemed for his candour in always telling a client at once whether the Waters would be likely to benefit his case or not. The doctor tells his early history in simple and almost plaintive words. He came to Bath principally for his own health: for his "sickliness and tender constitution was one of the main motives that prevailed with him to bend his study towards physic." At first he had what was called a "riding practice," while the older physicians had the "Bath practice." He began with himself, the "first patient he ever had," and after a long course of bathing, drinking, and exercise on the neighbouring hills, he blessed GOD in his 74th year that he had neither gout, cough, asthma, or dropsy, nor any remainder of the scurvy, but want of teeth. "May the will of GOD be done by, and on, me and mine."



a watery grave. The lot of the poor appeared to be especially hard, inasmuch as everything was tried for them first; and then, when everything had failed and the disease had grown more obstinate by time, and danger had arisen of the unfortunates becoming "burthensome to their parishes, recourse was had to the Bath."\* Looking through a number of cases recorded during the seventeenth and eighteenth centuries, I find that nine or ten weeks are mentioned as an ordinary period for a stay in Bath; but a cure or great improvement was often accomplished in a much shorter time. Thus, one person was made well in fifteen days, and after only six baths; and another in one week, and by three bathings. A common practice was to come every year for six weeks, even for twelve successive years, if the disease or the disorder seemed to yield. Patients were retained in the Mineral Water Hospital sometimes for half a year, and occasionally for a year and a quarter or a year and a half. Persons in all ranks of life had their professional and friendly comforters, and were warned against being hasty and parsimonious, as more cures were thereby spoiled than "the bath or the best methods of medicine do perform." The French proverb was

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\* The Mineral Water Hospital in its early years was called an asylum for incurables, for "none were sent there that could be got well by other means."

repeated that the English do not own themselves sick soon enough, and think themselves well too soon : and some of these silly English were reported to sit over boiling springs till "their humours are so rarefied as to bring on faintness, sickness, vertigo, and palpitations." It was urged on reasonable persons that the length of time a complaint has lasted proportionately retards the cure ; and that a second and a third visit might do what the first did not. It was shown that a steady continuance in the use of means was absolutely necessary to conquer all stubborn and inveterate diseases ; and that an early amelioration of symptoms was a great encouragement to go on. Chronic maladies are the proper province of natural or mineral Waters : and aid must be sought from a new manner of living, new air, new faces, and new amusements.\* Hear what Sydenham says about gout :—"No man in his senses can expect that momentary alterations wrought in the blood by medicines or diet, can perfect the cure ; the whole habit must be changed, the body must be hammered out (as it were) anew." And so in old illnesses, we must not flatter with the prospect of a speedy change ; for the sick (wrote Dr. Suther-

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\* Warner quotes Seneca that pleasure in all varieties of forms are ever to be met with in these places in which hot springs are found.

land) put most confidence in physicians who never deceive them with vain promises. Finally, although a disorder seems sometimes almost to go away while a person is in his bath, it is sure more or less to return : but the invalid may be truthfully cheered with the nearly certain hope that he will feel increasing good after his arrival home.\*

Such was the true and practical philosophy offered to many poor crippled and helpless creatures who, after much suffering and labour, managed to reach at last this haven of Hot Waters. And the clinical experience of to-day teaches us that most of this advice is perfectly sound. For instance, a person who has an obstinate skin disease or a lingering rheumatism, would scarcely expect to feel much improvement before sixteen or twenty baths had been taken, possibly twenty-four. Speaking generally, it might not be worth while to come to Bath from any distance for a period less than six weeks, and often three months would be much better. Prodigies of healing are undoubtedly done in a briefer space ; but, on the other hand, Nature's gifts may come with much more tardy steps. The best opinion can be only a skilled conjecture, and every prac-

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\* Dr. Guidott relates the case of "a lady who expressly said that she received no benefit in the place, but recovered at home."

tioner in Bath meets with unexpected successes and disappointments.\* A gradual benefit is a very hopeful sign, and may justify a prognosis of complete and permanent recovery. In the early days of the fame of the Bath Waters invalids came here in the former part of the summer, and went away in the latter part, chiefly because the roads were then in the best condition for travel. Afterwards (150 to 200 years ago) it became the custom to visit Bath for medical purposes in April, to leave during the height of summer, and to return (if possible) in September. The physicians then in repute recommended the "spring and fall," because those seasons were most free from excess of heat and cold, and therefore "fittest for all persons and distempers." But Dr. Charleton professed himself unable to understand why the Waters were not used in the summer, and quoted the usage of almost all other Spas in Europe. He relates cases in which a salutary progress was evidently helped by good weather, and adds that in the "cold tempestuous season of 1763-64 scarcely a patient found the least amendment;" but directly the skies changed for the better, "almost all became imme-

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\* To explain these different results various causes were formerly assigned. Some blamed the stars and some the bissextile years; others charged the failure on pestilences and earthquakes.

diately sensible of the efficacy of the Waters.”\* When Dr. Peirce was asked, What do you do with your baths in the summer? “We then have leisure to bathe ourselves,” was his prompt reply. However, we cannot doubt the present more delicate susceptibility to the influence of temperature and climate; and the creation of Buxton as a thermal Spa for the midsummer months is a proof of this, in spite of its much inferior qualification of natural heat of Waters. It is an obvious truism that a town cannot be a “summer place” and a “winter place” too; and the fact that the site of Buxton is higher (above the sea) than any of the hills around Bath, connotes certain atmospheric qualities which are quite independent of latitude. Assuming that a malady is not urgent, and that a full choice of time of year can be exercised, the invalid’s best months in Bath are September, October, April, May, and June. Other months are permissible and enjoyable: but the least suitable parts of the year are the weeks of commonly greatest heat (latter half of July and the whole of August) and of greatest cold (January and February). Many infirm people are obliged to visit

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\* It may be noted here that Dr. Lucas agreed with Dr. Charleton. In the provisions made for Bellot’s Hospital, it will be remembered that the months of April, May, and September were specified as those during which the Hospital was to be open.

Bath when they can ; and to these I say, in summer lodge on one of the hills, and in winter as near the baths as is convenient.\*

Our medical forefathers did not invite anyone to stay in Bath whose case was not likely to improve. Dr. Peirce says of a gentlewoman that he was anxious for her to go "lest the great bell should have rung out for her, and the enquiry would have been made whose patient she was, not what distemper she had. With the vulgar the physician that doth not cure shall be sure to have the reputation of killing the patient that dies, be the disease never so much incurable." Of some doctors living at a distance it was uncharitably asserted that they sent patients here to die ; but these were "sent back by hard shift that their own bell might ring for them, not ours." One merry fellow thought that the baths were doing him harm, and it is recorded that he straightway went and cured himself by plunging into cold water. But the dominant professional idea then (1660-1700) was to maintain the public estimation of Bath, and to drive from it anyone who might bring the "place and the means into disrepute" by dying here.

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\* The medical antiquarian will find some shrewd and practical advice on this subject in Dr. Venner's pamphlet, "The Baths of Bathe : or a necessary compendious Treatise concerning the Nature, Use, and Efficacy of those famous Hot Waters." London, 1628.

Thermal Water put in motion confers new and powerful therapeutic qualities. Some motion is necessarily imparted by the activity of the bather ; but I speak now of fluid currents external to the bather, and directed with more or less force upon his body. In primitive ages the water was taken into buckets by tall and strong guides, who lifted the full bucket as high as they could, and then let the water fall leisurely on the part affected. It was thought that greater impression was made by this plan, and that the efficacy and virtue of the fluid were carried "into innermost parts" further than common bathing could take them. During this process, which was clumsy and inadequate, the patient stood in the hottest part of the bath. Dr. Jorden introduced a method more easy and scientific, and got four pumps erected ; one in each of the principal baths, and in recesses made for the purpose. The pumps were called "wet" and "dry;" the wet pump drove the Water on the invalid when he was in the bath, and the pump quaintly called "dry" operated without immersion. We call them now the dry and wet douche (Ital. *duccia*); the latter being for a long time the only one used. It was the custom to pump every part of the body, even the head and the back part of the neck ; and the thigh has always had particular attention on account of the frequency of sciatica. Pumping over

the region of the stomach was recommended in cases of vomiting and heartburn.\* When a person had "difficulties in his gullet" and could not swallow his food, it was usual to pump his throat and front of the chest. Patients who suffered from a supposed palsy of the tongue, affecting the power to speak and swallow, were made to apply the mouth to a "stream continually running, so that the Water flowed to the root of the tongue for a long time." Benefit was alleged in similar cases from gargling with Thermal Water. Very hopeless examples of disease, such as distortion of the spine, chronic wounds and sores, and withering of the limbs from atrophy of muscles or nerves, were submitted to violent and passionate strokes of Water, as if Nature's wrongs could be sometimes flogged into right.

The fears of the timid were now and then kindly consulted in the following way. The lame part (say an arm or a leg) was first put into a pail of Thermal Water every evening, then twice a day; the bath was then resorted to, with pumping in it;

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\* A line of Horace (Epist. I.)—

"Qui caput et stomachum supponere fontibus audent"—

shows that douching on the head and stomach was a practice which ancient physicians sanctioned, though it would be thought now a strong remedy even by professed hydropathists.



and finally a bath was taken every morning, with a dry douche in the evening. After the latter bed was the universal prescription, with an order to wrap the joint in a hot flannel. One or two centuries ago it was as well known as it is now that there might be valid reasons why a person should not bathe, and yet the "impulsive force of a pump" might be an exceedingly proper mode of applying the Waters. A very limited local malady would really require nothing else. But just as the time of sojourn in a bath used to be preposterously long, so the number of pump-strokes often inflicted seems to us now quite astonishing. Dr. Peirce relates of a Sir John Gell that he "bore 700 or 800 pumps upon his bare head, then 1500, then 2000, and so on for five or six weeks every year ; decreasing at the end of each course just as he increased at the beginning."\* Deafness and violent headache were successfully treated by douches on the ear without limit. Two thousand strokes and upwards on the thigh were usually ordered for the relief of severe sciatica ; in one case the pain was removed after four pumpings, and the cure was completed by ten more pumpings of a thousand strokes each.

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\* It is remarkable that Sir John Gell's symptoms were those which would make us most hesitate at the present day. He had "stupor and dulness ; a seeming clout about the tongue ; and a creeping and sleepiness in the arm and leg."

Late in the last century, however, the application of the remedy became more moderate, for Warner speaks of 50 to 200 or 300 strokes at a time as sufficient ; and delicate persons will hardly ask for more. Our present practice would, perhaps, grudge the time and trouble for the tremendous hydrotherapy of past days ; but for other reasons it must be deemed excessive. A more mild and frequent regimen is better ; and if the use of the douche be the prominent point in the treatment, a wet and a dry douche can be taken on alternate days. There is no objection to a dry pumping every day ; and if the bath clearly disagree dry pumping may be entirely substituted for it. The bather finds the stream much blunted by the medium through which it is impelled ; and if he remain in the Water for fifteen or twenty minutes, a continuation of the douche for eight or ten minutes (with a little interval) is as much as is desirable. He may himself direct the douche upon the affected part, moving it from one part to another and varying the distance ; or the torrent which filled the bath can be made to flow again and strike the upper region of the body. The temperature of the Water in the dry douche must be considerably lower, and its force and duration need to be modified according to the strength and age of the patient. It can be altered by a simple apparatus into a miniature shower-bath,

which is more agreeable and sometimes more advantageous. Under no circumstances whatever should a douche be pointed to the head and neck without medical instruction.

Small segments of the body may be separately bathed. In local affections of the hands and feet, patients of the Mineral Water Hospital occasionally soak the parts twice a day in Thermal Water. Cloths or flannels dipped in the Water are sometimes put around the limbs; and it was once the fashion to lave the head in some diseases of the scalp. It deserves notice that among the ancients aspersion was rarely resorted to in natural baths, but was very common in artificial baths on account of the scantiness of water, which often forbade total immersion.

Concurrently with the external use of the Bath Thermal Waters, as now described, shampooing or a gentler sort of friction can be tried with the hope of more or less benefit. Gymnastic exercises have been resorted to from time immemorial, probably from the period when the baths were restored under Agricola's government. The combination of these exercises with shampooing is called on the Continent *massage*. Formerly it was pursued empirically in parts of Germany (chiefly by shepherds and smiths and barber-surgeons) as a means of treating injuries of limbs. In almost all books

on diseases of joints the kneading or *massage* of limbs was indicated as an agent for treating distortions. The French literature of the subject is very copious; for French writers do not mean merely kneading and rubbing, but passive movements, separation of adhesions in the tendinous sheaths of joints (with or without the inhalation of chloroform), and sundry gymnastic performances. All these are included under the denomination of *massage*, and thus half-forgotten remedies and little-esteemed methods are again brought into repute. But scientific shampooing ought to be an essential part of every bathing establishment, and nowhere is the process carried out better than at Aix-la-Chapelle. The use of the flesh-brush is a good adjunct to the proper bath-treatment, and is essentially a mild form of shampooing. An excellent vapour-bath has been lately added to one of the dressing-rooms at the Grand Pump Room Hotel.\*

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\* Dr. Tobias Smollett, in "An Essay on the External Use of Water, in a Letter to Dr. \* \* \*" (London, 1752), observes that the method of Vapour baths, "so safe and salutary, approved by every physician of candour, learning, and experience, hath never been practised at Bath, which is the great hospital of the nation, frequented by almost all the valetudinarians whose lives are of any consequence to the commonwealth." Dr. Smollett gives an account of the Vapour apparatus invented by Mr. Cleland, surgeon, by whom it was shown to the Prince of Wales and Mr. Nash; but the Corporation seem to have treated Mr. Cleland in

It was the part of the fable of King Blaedud that he bathed in the Waters and the Mud together. The tradition was that the Mud (otherwise called "scum") is as effectual as the purest Water ; and the old Leper's bath had a great reputation because, being replenished with the waste Water of the Hot bath, it had more of the Mud mixed with it. This substance was applied in the form of cataplasm "chiefly in hard white swellings and contractions of the limbs ; or where a callus or slimy matter is wedged into a part or joint" (Dr. Peirce). In diseases of the skin the Mud was put on as a "pultesse" until it became dry ; it was then washed off with Bath Water and fresh Mud again applied. No cure of rheumatism was thought perfect if the Mud of our Thermal Water were not used.

#### (B) THE INTERNAL USE OF THE BATH THERMAL WATERS.

The internal use of Mineral Waters is a comparatively modern practice. The earliest record of this medical application of the Bath Thermal Waters is in Dr. Jones' well-known "Baths of

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a very contemptuous way. Dr. Smollett was bold in his criticism of Corporation manners and management. The author now cited will be associated by the general reader with some famous works of fiction, and was no mean historian. He died while travelling near Leghorn, in 1771.

Bathe's Ayde," where there are particular directions as to time, manner, and quantity. But some later writers were almost adverse to it ; and even Dr. Guidott was doubtful, asking how could such a "deluge of Water" do otherwise than "relax and soften the fibres?" Dr. Jorden would have spoken more favourably had he been sure that people could have the Water "pure from the spring," and unmixed with that which had been employed for bathing ; a singular comment on the arrangement of those days when we remember the unavoidable and lavish waste always going on. Professional opinion and usage were very unsettled until about the middle of the 17th century, when a great impulse was given to the practice of drinking thermal Water by the advice and example of Sir Alexander Frayser.\* It was maintained that warm

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\* Previous to this date the internal use of thermal Waters had been encouraged by several distinguished medical men, partly from what they had seen abroad and partly from what they had heard from others who had travelled. Their advice, says Dr. Peirce, "was followed by very few." Sir Thomas Browne (the illustrious author of *Religio Medici*), in a letter dated July 12, 1677, thus wrote to Dr. Peirce :—"If my old friend Dr. Bave had taken more notice of my counsel, the drinking of the Bath Waters might have been in use long ago ; for above thirty years since I writ unto him to bring them into use, according to the custom of many other baths beyond sea, which he very well knew, but would not hazard his credit in such a new attempt ; which

Waters have three advantages over cold ones :—(a) the heat is more agreeable to the stomach : (b) there is a balsamic healing virtue in them, which no cold Water possesses : (c) they may be drunk at any season of the year. The operation of the Bath Waters was described as something between Epsom and Tunbridge ; being purgative when taken fast, and diuretic when sipped slowly. Gradually the theory of drinking the Waters became submitted to scientific reasons and rules. It was acknowledged that although some effects, external and internal, of the Bath Waters are common to itself and simple warm water, heat and fluidity alone would not be the sole causes of their specific medical power. A simple hot fluid would not raise the pulse, increase the secretions, and excite the whole system. By the observation of these effects in a healthy person, physicians hoped to deduce the action of the remedy in disease. It was noted by Dr. Saunders and Sir George Gibbes that although the Bath Waters were capable of increasing a febrile state of body when such already exists, they do not produce it as an ordinary event : but “painful and distressing symptoms” (as headache and determination of blood

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notwithstanding had not been an innovation, but rather a renovation or renewing a former custom.” Warner writes that people who drank the Waters in Queen Elizabeth’s reign were described as of “more than ordinary courage.”

to the head) might nevertheless be caused by them. Dr. Granville discussed the subject in a practical form, and called attention to the "immediate and sensible effects" of drinking the Bath Waters:---a glow in the stomach, felt sooner and lasting longer than after common hot water; a warmth in the head and a quickening of the pulse; a gentle moisture on the skin and slight diuresis. The "secondary effects" were described as exhilaration of spirits, increased appetite, more sleep, and a feeling of inward support. Dr. Granville argued that the Waters clearly disagreed if the glow at first perceived were connected with a feverish heat, if the skin remained dry and the tongue got furred, and if the head ached and a giddiness came on. But there are "mixed effects" in those cases in which the early grateful sensations are followed by febrile excitement. Such is the rational formula which has been sanctioned in the main by modern practitioners, and which may be safely applied to the necessities of disease under proper supervision.

The old and true doctrine of drinking from a mineral spring was that the fluid should be taken warm, and from the very "nose of the pump." The vulgar said that a draught of Thermal Water quenched thirst better than double the quantity of ale, or of any other common beverage; some "set their mouths to the spout and drank;" others



brought their cups and received the Water "sincere from the spring." The medical injunction was to drink while the "aerial bubbling lasts;" not in a hurry, but sipped slowly; for even a cold mineral Water should be taken at leisure. Many drank what was in the upper part of the glass and threw away the rest, repeating this two or three times: and some pretended that they could not bear the gaseous bubbleings, which made them (so it was said) flushed and giddy. Some persons took the Waters hot at the fountains, and cold at home during meals. Not a few disbelieved the medicinal virtues of a spring in which the saline constituents exist in comparatively small proportion: "so little a soul," complained one, "in so large a body." But the heat is a part of the "soul" which gives activity and power to all the other parts. Substances minute in quantity would probably pass "unnoticed" through the circulation, if dissolved in a cold medium; and the diffusion of the iron is particularly helped by the warmth and briskness of the Waters. Still it was generally confessed that there are some constitutions to which these physical qualities (warmth and briskness) are the essential things required, all other points being subordinate thereto. And as in the external use so in the internal, each of the springs was supposed to have special therapeutic virtues. The code of medical

rules ordained that the invalid should begin with the Hot or Cross bath Waters, advancing by degrees to the Waters of the King's bath : and no one pitied him if the transgression of this order brought any bodily hurt or illness.

Drinking the Waters was from time immemorial a preparation for bathing. To bathe without taking the Waters a short time first was thought rash, if not a great mistake. The old notion was that drinking and bathing should never be together, for it was imagined that one "cramps and supplants" the other : but both Peirce and Guidott gave better advice, and allowed their patients to drink not only during a course of bathing, but while in the baths. It was urged by Sir George Gibbes that a "greater effect" is produced when the Waters are taken while a person bathes.\* Not uncommonly a full draught from the spring was taken in bed in the hours of early morning. Another plan in certain cases was to administer the Water cold : for Dr. Baylies relates of a Mrs. Colborne that a supply of

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\* Dr. Guidott made the extraordinary statement that "bathers who drink have no thirst ; whereas formerly when not taken inwardly, the bathers were so greatly afflicted with it [thirst], that weak heads have been near an intoxication by taking other potable liquor to quench it." Bathers would (for some complaints) sit in the hottest part of the King's bath for three or four hours, and drink largely of the Waters all the time.

the Water was sent to her in London, where she drank it and found much relief; but when she came to Bath and drank at the fountain-head, all her symptoms were aggravated and "her blood heated." Thus, added the Doctor, "may the Bath Waters by proper management be rendered beneficial in diseases wherein, in their natural state, they are highly improper." Guidott says that it was quite a fashion in his day for people to decline to come to Bath, and to send for the Waters to their homes: "not thinking it much material whether Mahomet go to the Mountain, or the Mountain come to him." But it was agreed that the virtues of the spring were much impaired by this transmission. Everyone drank a moderate quantity at first, beginning with the mildest spring and the smallest glass (a quarter of a pint three quarters of an hour before breakfast). The same quantity was repeated between breakfast and dinner. A gradual increase was allowed until the patient took two glasses early and again late; with an interval of half an hour between the glasses before breakfast, and an hour between the glasses in the middle of the day. If everything went well, the patient was sent on to the King's bath, and the quantity of Water taken was increased in the same ratio. A month's trial of this plan was allowed, and then a pause of two or three weeks was

advised; or there was a shorter intermission at more frequent intervals. No food was permitted just before and after drinking from the spring; and some walking exercise was usually enjoined in favourable weather.\* After a few weeks here to drink and bathe in the Waters, a patient would come at length to drink only: and in unpromising instances the rule, "bathe less and drink more," was universally enforced.

This "drinking more" was carried sometimes to an astonishing length. Many took (in Dr. Guidott's time) ten pints in the day,† with the direction to walk for some minutes after each pint or quart. Unlimited measure was now and then given, or *pro tolerantia*. Dr. Peirce's patients often drank three pints the morning after arrival, and afterwards regularly two quarts *per diem*, intermitting a day sometimes. An alderman of the city, suffering from all sorts of troubles, drank a quart of thermal Water every day for nineteen months, and was restored to "perfect ease and health." "How miserable a man had I been," said the dignitary, "had I lived anywhere but in Bath." It was the

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\* This walk in a "temperate air" was recommended by Jones, in his work already quoted, three centuries ago.

† An even higher estimate is given in the *Thermæ Redivivæ*, by Henry Chapman (1673), who records that two or three quarts were taken every morning, and repeated through the day.

custom to dine at 12 or 1 o'clock, and to have supper in good time in order that "the body might be clear by the morning again." Some physicians were much more temperate in their prescriptions, and desired convalescents to drink only so much fluid as "shall not be grievous to the stomach ;" for (said one old physician) it is necessary to "cleanse this useful receptacle from all infirmities lodging in the folds thereof, and then to procure an appetite." At the end of the last century the rule was (according to Warner) to divide the daily dose of the Water into three portions ; two of which were taken before breakfast, allowing the space of half an hour between each, and one at noon. The amount of casuistry expended in former times on this subject may be inferred from the following questions (published by Dr. Guidott), which remind us of Bishop Berkeley's ingenious Querist :

(1) Whether the Bath Water ought to be drunk Hot or Cold ? (2) Whether in great or small quantity ? (3) Whether it may be drunk at meals ? (4) Whether Bathing or Drinking may be done on the same day ? (5) Whether Drinking may be in the morning and Bathing in the evening of the same day ? (6) Whether the Bath Waters ought to be taken many days together, or else some days to bathe, and some to drink ? (7) Whether large

draughts may be taken, or more moderate? and what time is required should be between the draughts? (8) How many days it is convenient the Bath Waters should be drunk? (9) Whether any medicines may be usefully taken with the Waters, to further their operation? (10) What times of the year are most proper to drink it in? (11) Whether the Bath Waters may be taken in winter? (12) Whether the Leap Year hath any malign influence in drinking the Waters? (13) Whether the Waters may be safely used in the Dog-days? (14) Which is first to be done, either bathing or drinking?

I am persuaded that our present practice in drinking Thermal Waters is too restricted, if the old methods were too extravagant. The timid penurious dole which is now commonly prescribed, with infinite cautions about the danger of taking too much, reads like a quiet censure on the bold medical ways of generations gone by. Looking at the matter from a chemical standpoint, we must see how small a quantity of saline material is introduced in a given bulk of fluid; but that bulk of fluid is Nature's way of offering a medicine. Interrogate Nature, and she says:—"I give a medicine through a medium which is hot and diluted:" that is to say, the heat and the dilution are the conditions on which the medicine is supplied. Alter the conditions and the result is not Nature's

preparation, but our own. But the whim of some former physicians was to change the natural spring to suit the disease, rather than to collect the diseases proper for the operation of the spring. Thus Dr. Baylies asks:—"When the Waters disagree, is there no other method of correcting that fault but ordering them to be taken in smaller quantity, or blended with other medicines? Is it not the business of the physician to increase or lessen each of the ingredients which is separable from the Waters, as the case may require? The virtue of the saline and fixed parts of these Waters, like most other powerful remedies, depends on their being exhibited in a certain dose. As particular cases may require more of these fixed parts than is contained in such a quantity of Water as a sick stomach will bear, it cannot be irrational, in such cases, to have these salts separated from the Waters, and a solution of them in a small quantity of the same Waters, occasionally added to each particular dose at the fountain head. By this means the Waters, in particular cases, may not only be made agreeable to the stomachs of the sick, but every good obtained which the ingredients of the Waters, or the Waters themselves in their natural state, could in such cases produce." A similar view was expressed by Dr. Guidott, that inasmuch as the chief virtue of the Bath mineral spring

resides in the salts, the "best way to make it most serviceable and to free it from incumbrances and alloy, is to distil it and prepare it exactly as may be performed by Art ; for the benefit of those especially who are willing to drink the Waters with greater success in a lesser quantity, which they may now do and have more of the virtue of the Waters in a quart, three pints, or a pottle, than they formerly did in two or three gallons." Dr. W. Falconer may well exclaim (1790) that we must not judge of the properties of the Waters from the small properties of the active ingredients. The older physicians must have been destitute of humour when they ordered for their clients a private manufacture which they called the "Bath Waters!" The oddest things were also put into the Waters to "improve" them. Thus, spirits of nitre or warm tinctures were added to the glass usually drunk at noon ; and Mrs. Elizabeth Waller, daughter to the "famous Sir William Waller, Lieutenant-General of Horse in the Parliamentary army," and who came to Bath in August, 1675, had "coral, crab's eyes, and pearls" put into her glasses. Another person supplemented the thermal treatment by swallowing two pounds of soap during the course of every week. Substances and decoctions were freely prescribed as "helps" to the action of the Waters ; and by different authors are mentioned cephalicks,



neureoticks, antiscorbuticks, hysteric herbs, seeds, and flowers, antiarthriticks, cardiacks, *sal prunellæ* and vulneraries. A glimpse of returning common sense is shown in the admirable summary of Dr. Baylies (he did not care for these adventitious aids), who affirmed that "whatever may be expected from the use of a very gentle, subtle chalybeate and saline aperient, exhibited in a large quantity of pure water rather warmer than human blood and capable of an intimate union therewith, may be obtained from the prudent use of the Bath Waters." Hence, from the medical aspect of the question, we are justified in prescribing larger quantities of the "warm diluent" in order to gain useful doses of the saline and gaseous ingredients.

Another question of different and wider scope relates to the prescription of regular pharmaceutical medicines in combination with a course of drinking the Thermal Waters. Divergent views have prevailed during three centuries of medical practice. Give the Waters, asserted one doctor, in their own native purity, and not adulterated with a discordant jumble of medicines ; and the effects of the former will be not only more visible, but more desirable to the patients that take them. When the Bath Waters, discoursed the same doctor, are proper remedies the patient should be allowed to use them fairly

without having his constitution oppressed by a struggle between "the action of the Waters, shop-compositions, and a disease at the same time." But seemingly opposite opinions came from the same authority when he said he was truly convinced that medicines and the Waters not only may be, but often are, used together, to the mutual augmentation of the powers of each other ; and, further, that the internal use of the Waters is an excellent preparation for a course of other medicines. There is much truth in both aspects of the problem ; and I can exemplify my meaning by a reference to the sufferers admitted into the Bath Mineral Water Hospital. As a rule generally accepted, no pharmaceutical preparations are ordered when the patient enters the house ; to drink the Waters and to bathe in them constitute the entire medical regimen. This is simply *fair play* to the natural medicine which the patients are sent here to have ; and a large proportion of them are cured by it alone. But not seldom complications arise, or perhaps old peculiarities of habit and constitution are brought out. Or it may be tolerably clear that the favourable progress of a disease demands some help from art, by which the satisfactory dismissal of the convalescent will be hastened. To meet these exigencies skill and judgment are required, and an intuitive

knowledge of the circumstances in which it may be our duty to interfere.\* This is, I believe, a fair statement of the point in debate. And the application of the principle is illustrated by the following cases which were told with much impressiveness by the medical men of two hundred years ago. "A person well known, of great good nature and continual flow of cheerful spirits, much beloved and caressed, came to Bath, keeping down neither food nor physic. As soon as she reached Bath she made all possible haste to the pump ; and she was seen to drink off a middling glass of the Water, with an eagerness and joy which we may form the justest idea of from the figures in Poussin's charming picture of Moses striking the Rock. The miracle was almost as great ! She drank another glass and declared that she felt herself quite well. And so by the help of the Bath Waters she lived a most comfortable sprightly valetudinarian all the rest of her days." Then there was a Lady L——, who, "when the vital flame was blinking in the socket, and the soul (one foot over the threshold) turning out of its decayed and tattered tenement,† by the

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\* In old records it is frequently stated that "inward medicines" were used at the same time as the Waters.

† The soul's dark cottage, battered and decayed,  
Lets in new light through chinks which Time has made.

WALLER.

cautious use of the Bath Waters and bitters had a new life put to lease. This lady was so very weak that at first we gave her but two or three spoonfuls of the Bath Waters, and about half-an-hour after one spoonful of a bitter infusion, an hour after that a little more Bath Waters, then bitters again ; and so by degrees from less to more I brought her to bear half-a-pint of the Water hot from the pump, which staid without loathing. In the space of nine or ten weeks she recovered her health to admiration ; so that when she went to church or to walk in the Grove, as she came out of her chair she was pointed at, saying, ' There she is ! That's she ! That's the lady that was so weak ! ' ”

A further topic of interest is the mode in which one Mineral spring may assist the medicinal action of another. Thus, it was the custom in some cases for a course of Cheltenham Waters to precede the internal use of the Bath Waters ; particularly among persons coming from India with a disordered liver. Surgical help is sometimes as much needed as medical ; including tenotomy, stretching the adhesions of joints, and the proper application of splints, irons, and bandages. Recumbency and gymnastic exercises are two principles of treatment susceptible of wide application ; and the Bath Mineral Water Hospital is liberally fitted up with suitable apparatus. A “ complication of distempers ”

used to be an ethical puzzle with those physicians who conscientiously wished to do right, but who hardly knew which road to take. Many settled the difficulty (in the words of Dr. Peirce) that the "most urging must be set upon," while a discriminating eye was kept on possible dangers in other directions.\*

It was with a dash of festival joy that the convalescent often started from Bath on his homeward journey. The doctor, apothecary, nurses, and friends turned out to see the cavalcade go, and uttered hearty congratulations on the success of the visit. Some who came here in litters rode away merrily on horseback ; and they who travelled hither with the help of a staff departed on "mettled horses," or in showy hackney coaches. What a theme of endless gossip it was that a young lady, only fifteen years old, who had come to Bath unable to stand, recovered so completely that she danced at the Mayor's feast with applause ; and it was said of

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\* Concerning the dietetic order of every-day life, Dr. Oliver's words may be cited. "Fresh meats and such as are easiest of digestion, agree best with the Bath Waters and render them most effectual. As to malt drinks, I am of opinion that they ought wholly to be avoided and let alone during the whole course of the Bath Waters. Wine and cold Bath Water, or Water and a toast put hot into it, is much better and more agreeable." Dr. Wynter was on the "temperance" side, and asked of what service it could be to "drink a quart of medical Waters in the morning, if we swallow double the quantity of wine at night ?"

another girl, younger than the last, that she recovered so well in five or six weeks as to be able to "dance a jig with great applause at a ball which the gentry met at." One of these youthful creatures hung a knotted cane of her father's as a trophy upon the new marble structure in the Cross bath. This was a common way of expressing triumph and gratitude.\* Of several cripples who got well it is recorded that they "hung up their crutches," and often "near the throne of King Blaedud," as a species of votive offering. Of other poor souls the history says that they "threw their crutches away," or that they "discharged their crutches" with great relief. Many men who had come here supported by others walked along with only a "staff" or stick, proclaiming their steady progress to health; and young fellows would "swim a few times round the Cross in the King's bath," in order to display their returning strength and agility. There is no evidence that a public register of "cures" was ever kept in Bath; but in the relation of cases by the physicians it is repeatedly said that one "gave testimony" or "subscribed merrily;" of

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\* In the *Graphic* illustrated newspaper for October 7, 1876, is an engraving of the Grotto at Lourdes, with its forest of votive sticks and crutches. One old writer, fond of classical imagery, speaks of the crutches hung up at Bath in mid-air as "like the groves of Semiramis, and affording a not less beautiful prospect."

another that he "subscribed this benefit;" and of not a few that they "returned public thanks."\* Concerning one young man who came from London "very pensive to Bath," it is noted that for the great mercy of his unexpected recovery "he gave public thanks to God in the greatest church in Bath, Oct. 1, 1690, then appointed for a general thanksgiving." A gentlewoman "gave public thanks to God, the prime Founder and Creator of the baths, in the great church of Bath, dedicated to the memory of the Apostles Peter and Paul." In these simple and unaffected records we find expressions like "God's blessing on the baths," and with a touch of pathos the All Mighty is here and there addressed as the "Fountain of healing." And yet there must have been no small ingratitude, for Dr. Peirce says that though in our Lord's time "only one leper out of ten returned thanks, much fewer than this proportion evinced any thanks for the benefit of the Bath Waters."

Dr. Oliver called Bath the *Asylum Morborum Chronicorum*, the common sanctuary for all persons that labour under any chronic distempers: where scurvies, cachexies, and all other lingering maladies may be cured *citò, tutò, et jucundè*. Diseases (wrote

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\* It might be wished that there was now and then a special thanksgiving service at the Abbey, for those who are about to leave Bath "relieved" or "cured" by the Waters.

Dr. Sutherland) which defy the utmost stretch of distant wit, find a Bethesda here : and the idea of curing, or mitigating, or preventing those diseases has been ever pursued with energy and singleness of purpose. But medical men have long recognised what are technically called "contra-indications ;" that is to say, tendencies or symptoms which tell us plainly that there must be no indulgence either in drinking the Waters or in bathing in them. At other times considerable modifications have to be made in the temperature and duration of a bath, and in the quantity of the Water taken. Warnings and cautions are scattered plentifully in the literature of Thermal Medicine; but what now have to be considered are the positive disqualifications arising from the co-existence of organic disease.

This subject may be formularised without much difficulty, though something must be always left to the discretion of the practitioner. Any hereditary or acquired tendency to the so-called apoplexy, or cerebral hæmorrhage, should make us very careful ; and the occurrence of a single epileptic fit compels a decided negative. A liability to consumption forbids any bathing; and a tendency to "catch cold," which may lead to chest complications, must make us mindful of the accidents of time and weather. Concerning the diseases and irregularities of the heart (that "noble muscle"), some misapprehension



prevails. Most of the older physicians allowed that bathing does not agree with inordinate motion of the heart, but rather increases it ; a few, however, contended that palpitations were allayed by quiet bathing. Better means of diagnosis would have reconciled the seeming discrepancy ; for “palpitations” may signify very much or very little. Of the four typical forms of valvular mischief of the heart, that which leads to regurgitation of blood through the aortic orifice is the most common cause of sudden death, and is an absolute bar to any use of the Bath Waters. Disease of the mitral valve allowing reflux of blood and consequent congestion of the lungs, is the next most serious form, and is almost equally prohibitive. Disease of the same valve obstructing the onward flow of blood is the usual result of acute rheumatism when it affects the interior of the heart, and is found in a large proportion of children and middle-aged persons who have had rheumatic fever. If the growing strength be well sustained and the bodily functions properly regulated, it is remarkable how the effects of this disease may be partially overcome. Some disability always remains ; but with watching care moderate bathing may be allowed in the majority of cases. If, however, a disagreeable tumult of heart always follows even a slight immersion, local douching is the only process to be permitted. When patients

suffering from any heart-disease are proposed to be sent to the Bath Mineral Water Hospital, it would facilitate the consideration of their cases if the kind of lesion were precisely stated. It is a subject of complaint (as old as the time of Dr. Charleton in 1774) that the occasional absence of this accurate information is a source of immense inconvenience ; as persons are sometimes sent from a long distance, to whom our thermal methods are totally inapplicable. In absolute terms it must be said that poor people who have the rheumatic heart-affection just described, should not be pronounced fit to come to Bath until the general health has been raised to the highest possible level ; and in all instances the fact of secondary complications should be specified, with their exact nature and duration.\* There are nerve-troubles in the neighbourhood of the heart (the so-called *angina pectoris*, for example) which, by their suddenness and urgency, make every kind of bathing improper : and a liability to spasm or obstruction of the bowels should render a person cautious. Dropsy in any form, whether local or general, indicates a condition of system for which thermal bathing (out of the bed-chamber) is

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\* The remaining form of valvular disease, *aortic obstructive*, is not necessarily a contra-indication, if the health be good. Medical men ought to recollect the possibility of the concurrence of two (or even more) forms of valvular imperfection.

usually injurious. Acute disease is *per se* an emphatic negative; and when the effects of acute disease have passed away, some organ or organs may remain permanently damaged.

The special advice of the surgeon may be requisite to answer the question whether a mal-formation or a rupture ought to forbid bathing. The latter may be so threatening as to demand the use of a truss during the whole immersion. The existence of aneurysm is always decisive.

Lastly, there are diathetic conditions which imply special cautions and safeguards. The constitutional history of every patient, whether furnished by himself or by a former medical adviser, should receive a diligent study. And it must never be forgotten that age brings its own degenerations and infirmities, often so complex and striking as to put a perpetual barrier to any use whatever of the Bath Waters.

#### (C). APPLICATION OF THE EXTERNAL AND INTERNAL USE OF THE BATH THERMAL WATERS.

Our attention has now to be given to the proper therapeutic application of the Thermal Waters of Bath. For practical purposes bathing and drinking can be conveniently discussed together: it is not often that either use is adopted to the exclusion of

the other, and generally they are a mutual help. The diseases will be named in order in which either or both methods have been described and commonly found to be beneficial.

### SECTION 1.

#### RHEUMATISM AND ITS CONGENERS.

A very large number of persons suffering from RHEUMATISM, or supposed rheumatism, come to Bath for aid in their troubles. Rheumatism is an acute or a chronic disease, and frequently has a long and painful history. What we have mostly to speak of here is not medical rheumatism, but its surgical pathology: that is to say, its effects on the joints and their neighbouring structures. The popular rule is to apply the term "rheumatism" to every joint which is large and painful: but medical men are expected to make an intelligent diagnosis, and to take a careful view of the antecedents of each case. Several diseases which have only a distant affinity are yet liable to be confounded, because they attack the same parts: and two or more diseases may be so grafted into each other, that their respective histories are not at all distinct. A patient consults a physician or a surgeon for (say) a big knee-joint, and of course declares that he has "rheumatism;" but the prudent adviser will not

give any name to the malady until he has investigated both past and present symptoms. He is not misled by words, and he takes nothing for granted ; but we will assume that the disease is at length discovered to be chronic rheumatism, or (more properly) the surgical effects of acute rheumatism. Trousseau describes a rheumatic inflammation now and then limited to a single joint (*i.e.*, monarthritis accompanied by conditions of rheumatism) ; and there is a single arthritis of a rather severe kind, in which there is no sign of any rheumatic state about the patient.

In acute rheumatic inflammation, then, a joint is filled with a turbid fluid and flakes of lymph ; and the sheaths of tendons, as they pass a joint, may be involved in the same way. The after-effects may be severe, and are those which concern us now. The ligaments contract so much that the joint becomes permanently stiff ; adhesions form between the articular surfaces by cords or bands of fibrous tissue ; and the synovial membrane may be so damaged by inflammation that it will not absorb the fluid effusion.\* There is further destruction when the cartilage is removed and ulceration of the bone is established : but such a ruin is beyond all remedial measures by mineral springs. We under-

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\* In my pathological descriptions I follow the best authorities :— Dr. Wilks, Dr. Garrod, Mr. Adams, and Mr. Jonathan Hutchinson.

stand, therefore, what has happened when a limb is crippled by reason of the enlargement and distortion of a joint after acute rheumatism.

In the course of this disease the fingers often become crooked, owing to a thickening and contraction of the ligaments; but there are no other material changes within the finger-joints. The swelling around them is the result of cedema from one of those frequently recurring inflammations which make these cases so intractable.

It is necessary to distinguish from rheumatism that pyæmic inflammation of joints which may occur in the history of fevers and of other specific diseases. This polyarthritis is very destructive, and affects particularly the wrist and the ankle, with the smaller joints near them. These cases are usually beyond the reach of medical therapeutics.

Rheumatic gout is the common name given to another chronic disease of the joints. The name is a bad one, because the disease is neither rheumatism nor gout: Trousseau's title of nodular rheumatism (*rhumatisme noueux*) is better: nodular arthritis is perhaps the best of any.\* This is a convenient place for describing a malady which is so liable to be grafted upon old and obscure cases of real

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\* Dr. Garrod calls it rheumatoid arthritis. In the official nomenclature of the Royal College of Physicians the disease is called chronic osteo-arthritis.

rheumatism. It was originally spoken of by Haygarth, and then by Cruveilhier; and the morbid anatomy has been minutely examined by Adams of Dublin. Nodular arthritis may follow rheumatic fever in such a way as to seem a continuation of that malady; so that this preliminary fever has been termed acute nodular arthritis. At first there is only the condition termed *hydrops articuli*; namely, an excess of clear synovial fluid, with a weakening of the ligaments and a thickening of the joint-wall. At a later stage the bone and its cartilaginous covering are affected by ulceration. A large number of joints are involved at the same time, especially in the feet and hands; and there is more or less deformity. New bone is produced in knotty masses around the edges of the articulation and in the capsular ligament; and partial dislocations are not infrequent. This terrible and disabling disease may occur at almost any age, and is common before middle life; but beyond a certain point it is quite incurable.

I have sketched a group of joint-affections which have many anatomical, and a few morbid, affinities; but which require to be carefully distinguished for purposes of prognosis, and for estimating the probability of successful treatment. How multi-form are the shades and grades of rheumatism! Ask any number of the poor creatures in the

Mineral Water Hospital what they are suffering from, and there is a singular unanimity in the answer, "Rheumatics." Analyse this "rheumatics," and no factor is found more variable in degree or in kind. One patient exhibits the effects of acute crippling rheumatism ; another has the paralysing deformities of nodular arthritis ; and a third is afflicted with the sequels of gout, or some disorganisation of joints from other chronic disease. The physician or the surgeon has often to trace his pathological outlines under difficulties of indistinct personal history, and the oblivion of important facts connected with former illness. There is a danger of confounding a simple surgical dislocation and its results, with a dislocation which is the result of changes in joint-structures ; a mistake not very uncommon in the instances of the hip and the shoulder. Without any discoverable lesion of joints, a patient may complain of pain and weakness for a long time after acute rheumatism : pain in several joints and weakness in many neighbouring muscles. Among the poor these infirmities are aggravated by exposure to weather, severe work, and sometimes defective nutrition.

A diagnosis (or a provisional diagnosis) having been made about a given case, the immediate inquiry is—How is it to be treated ? If a joint has lost for a time all extensile and flexile movement,



we should first try to discover whether this be owing to ankylosis, which is a mere ligamentary union between the ends of the bones, or to synostosis, which means a true bony union. The latter is usually a further stage of the former, and implies a greater destruction of tissues ; and such a mortaring together of separate bones can rarely be disturbed or broken down without serious risk. The conditions of the tendons passing over or near a joint, and the extent to which their rigidity may impede joint-movements, ought to be carefully noticed. An enlargement of a joint must be owing to a swelling of the joint-ends of the bones, or of the soft structures generally. Local increase of temperature should be accurately measured ; and its causes, if possible, ascertained. An affirmative or a negative on all or any of these points will determine the first course of proceeding, and the general therapeutic plan which may be ultimately successful. I must insist on the necessity of the absence or abeyance of all active and acute symptoms before any natural thermal methods are resorted to.

One result of a joint taking a fixed position (either extended or more or less bent) must be particularly observed. An immovable joint implies disuse of the muscles ordinarily employed in moving it ; and a muscle not exercised wastes in quality

and power. This is a collateral evil of no small moment, because a special engine of treatment has to be devised in order to bring the idle muscles into play again. For the pain and weakness of chronic rheumatism and for the early signs of nodular (or rheumatoid) arthritis, a warm bath should be had three times a week under the rules and restrictions already laid down. Abundant and systematic friction should be used during immersion, and shampooing with gradual passive movements afterwards. The douche (wet or dry) is often of immense utility, chiefly perhaps from rousing the languid circulation of a diseased part. Suppose that a case is before us in which there is no irreparable ankylosis of prominent joints (however stiff some may appear to be), and a moderate use of the limbs is still possible, we should bandage the feet and legs with domette flannel bandages in winter, and with bandages composed of thin calico in summer. These are to be always worn during the day ; they serve to support the weak muscles and to prevent cedema in lax tissues. The knees ought to be clasped with laced knee-caps (made partly of leather) ; but if these joints are at all tender they should be enveloped in oiled-silk lined with soft wadding, fastened with tapes tied above and below. Thus equipped, the use of crutches must be strenuously urged, both for the sake of exercising the muscles

and of sustaining the mobility of the joints. The patient should be encouraged to walk around his room several times a day, once or twice on each occasion ; and in fine dry weather on a plane surface in a garden. If there be a weakness of the muscles of the back so that the body falls too forward on the crutches, a towel may be fastened around the waist and its ends held by an attendant walking behind.

The treatment of the upper limbs demands not less assiduous care. Constant movement of the joints, short of producing pain or fatigue, should be promoted in every way. The fingers of one hand may manipulate those of the other, alternately bending and extending them ; the hand should frequently clasp a tense (not *too* tense) indiarubber ball, or a ball of worsted, or a large orange. A common kitchen roller-pin is an excellent device, the hands working up from the ends to the middle and back again ; and the moderate use of a piano (when possible) is always to be encouraged. It is important to attend to the wrists. The arm being firmly held by a friend, the hand should be alternately bent and extended ; and the patient himself can often rub the wrist (back and front) of one side with the outstretched palm of the other hand. The elbows are exercised by the patient grasping a mantelpiece (or an object of the same

height), and walking a little to and fro. In order to benefit the shoulders the patient should be steadily seated and the upper arms raised as far as possible towards the head, taking care that the shoulder-blades are fixed or at least do not rotate much with the arms ; and the patient should now and then sit for a few minutes at a time with the arms supported at (or towards) a right angle with the body. In all active or passive movements nothing approaching to force ought ever to be used ; and Dr. Garrod's rule is a sound one, that we should never allow such an amount of movement as to cause the joint (or joints) to be more painful on the following day.

A medical adviser who furnishes his "rheumatic" patients merely with routine instructions about the baths fails in half his duty. A bright gleam of hope for a large number of these cases is afforded by a skilled combination of medical and surgical means, of which the Bath Thermal Waters are only one. It is impossible to dispute the good effects of counter-irritation in some instances ; and no one will deny the sometimes remarkable efficacy of the nutritional tonics, of which the *facile princeps* is cod-liver oil. It sounds trite to say that there ought to be an abundance of protein and fatty food, and that hypnotic medicines are often needful. To do more than glance at these auxiliary topics would be beyond the scope of this volume. But I must insist

on the supreme importance of recognising chronic nodular (or rheumatoid) arthritis in its earliest stage, when its constitutional and local havoc is only beginning. After this the disease is *quasi-malignant* in its incurability, and in the hopeless wreck which is brought about. It bespeaks our pity and ambition to do our best when we see comparatively young persons emaciated and helplessly crippled, and dependent in everything on the ministrations of others. The Bath Waters are not a miraculous pool, though often of splendid efficacy; and it is right to be candid in our advice and prognosis, for any under-statement of the gravity of a case is sure to be followed by disappointment and distrust.

What was formerly termed "palsy after rheumatism" is the cumulative and general weakness which is frequently the sequel of an obscure rheumatic condition. Such a case as the following is common in our Mineral Water Hospital:—A man, after hard work and exposure to wet and cold, is "struck with pain in the back" (spinal rheumatism?); this pain extends to the thighs and the legs, and there is always more or less weakness. There is little (if any) fever, and no affection of the joints; but although the general health may improve and become even tolerably good, the pain and weakness obstinately remain. The medical reporter says that

“everything has been done,” which means that all the usual resources of medicine have been tried ; and so with a hope which is sometimes dashed with scepticism, the patient is sent to the Thermal discipline of Bath. And these cases nearly always do well unless the original illness be an early sign of the final break-down of age. Take the following case, drawn from life (November 11th, 1875) :— S. B., an agricultural labourer, was seized in November, 1872, with sudden pain across the hips which made him “drop down.” He was helped home by a person supporting him on each side ; and went to bed at once. The pain “went all over him,” even to the hands and feet ; and he could not turn his head without pain. There was no visible enlargement of any joint. He lost flesh much, and after suffering several months without relief he was admitted into the Mineral Water Hospital, in May, 1873. In one calendar month and four days he was quite free from pain, and could walk with the help of a stick ; and after he had returned home a month he could walk as well as ever. In May, 1875, the same kind of pain “struck his right knee,” and completely disabled him ; but there was no swelling and no constitutional illness. He was under medical treatment all the summer without material benefit. At this time (November, 1875) the pain had left the knee, but the weakness in all the

muscles of the back was so great that he could not walk at all. He had lost thirty pounds in bodily weight since the spring. He again left the Hospital convalescent, but we have probably not seen the last of him. This is a typical specimen of a class of invalids who find a beneficent asylum here. They paddle about the wards of the Hospital, and they traverse our streets in wheel-chairs. A hasty look or inquiry may lead to the suspicion of true nerve-paralysis (or paraplegia) ; but the history and the symptoms are alike conclusive. We must always try to get a *complete* history of such a case, and be quite sure that it has not some roots in alcoholic intemperance or in an acquired enthetic disease.

It was the conspicuous benefit conferred by the Bath Waters in similar instances which in the old times made people dumb with wonder. Towards the end of the 17th century the case of George Long, Esquire, of Downside, caused an "immense sensation." He was brought here in April, 1691, with crooked fingers, right knee, and hip, and a motionless back. So contracted was he that he could not be extended in bed. He had importunate thirst, no appetite, and a shrivelled skin ; the face was meagre and the hair grey. There were several internal troubles also. He was brought to Bath with great difficulty ; and immediately drank the

Water hot in the morning and cold at meals. In a week the thirst was abated ; and in a month he bathed "between whiles," which eased the pains. He returned home at the end of May and came again at the end of August, having gathered some flesh and strength and "some small ability to go, though cripplishly." He again stayed here several weeks. By the end of November his grey hairs began to fall off and new ones succeeded ; nay, some grey ones returned to their colour. By Candlemass he had few or no grey hairs left, but a good deal of soft brown hair such as he had when 25 or 26, and it grew so fast that he cut more than an inch every four or five weeks. Mr. Long lived here during the greater part of 1692. His old and ragged toe-nails came off, and new and smooth ones grew. His arms and hands recovered strength, with more motion of their joints ; the muscles became plumper, and he daily became more erect ; while every bathing "stretched him half-an-inch." The eye was vigorous, and his face ruddy and youthful. So well and young was he that an unbelieving friend inquiring of his health, his wife replied—"I believe if I were dead he would marry again." Finally he was returned to Parliament, and two months before election he rode from Bath to Oxford in a day. Once, too, he rode home 12 or 14 miles after midnight, went to bed for two or



three hours, rose again, and dispatched a great deal of business before breakfast.

This case was related by Dr. Peirce, and others equally striking are told briefly by Dr. Guidott. A clergyman is described as "a Quaker against his will," because he could not take off his hat by reason of a contracted elbow ; and the involuntary Quakerism was soon cured. Sir Robert Holmes, Governor of the Isle of Wight, recovered from "old aches and bruises received at sea." A case of "universal palsy after rheumatism" was quickly benefited. A child with a "contracted ham" was restored in fifteen days (after six baths). T. B. of London, aged 50, came to Bath in June, 1688, for palsy and weakness of the lower limbs. He was obliged to use crutches ; but after a month's use of the King's bath, he could walk on foot to the bath and back to his lodgings without help. A woman of Herefordshire, aged 40, was for three years so afflicted with rheumatism that she could neither dress nor feed herself, and her hands and feet were much swollen. She came to Bath in March, 1683, used the King's and Queen's bath for three weeks, and "received cure." It is stated that at the end of a week she could put on her clothes and help herself to meat. Tabitha Taylor, of S. Thomas' Hospital, Southwark, came to Bath in 1684 with hams so contracted that she went upon her

knees and "promoted her motion with hand and foot. She used the King's and Queen's bath for three months, and was then able to stand upright, and without crutch or staff went away cured." Lastly, to illustrate what was done in very serious cases I quote the instance of a "hopeful young gentleman" named Grierson, who came all the way from Scotland to Bath. He had (it was alleged) been "experimented on by Physicians and Chyrurgeons," and even by bone-setters too. He came here in "most exquisite pain;" and being laid in a "kind of cradle bottomed with Girse-web," he was let down by degrees into the bath. The end was tragical, for consumption "gained on him and he died."

The candid reader will acknowledge that these narratives are not "cooked" or otherwise manipulated to support any particular theory. The honest effort of the physicians was to find out what the Bath Waters could do, and what was really done often astonished the most sagacious observers. Of course there was no scientific discrimination of the forms or phases of "rheumatism;" and it may be fair to infer that the apparently incurable cases belonged mostly to the class now called nodular (or rheumatoid) arthritis. There was no recognition of those diseases of the joints which depend upon central nerve-lesion, and which have been recently

described by Professor Charcot.\* Of one person whose history is related by Dr. Peirce it is stated that his knee was "stretched;" and this is unquestionably a legitimate proceeding. About eight years ago a surgical colleague helped me in forcibly stretching adhesions (ankylosis) in the knee-joint of an adult patient in the Mineral Water Hospital, and the result was fairly successful. Gradual stretching is more often applicable, and is easily effected by a Macintyre's splint. On three occasions I have performed tenotomy when the contraction and shortening of tendons have seemed to be an invincible obstacle to the proper extension of a joint.

The so-called strumous inflammation (pulpy degeneration) of joints, so common in children of a consumptive tendency, must never be submitted to any treatment by the Bath Thermal Waters.

## SECTION 2.

### GOUT.

The surgical pathology of GOUT is essentially distinct from that of Rheumatism. In their complete development the two conditions are very different, and gout rarely complicates nodular

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\* For a compendious account of this subject see the Brit. & For. Medico-Chirurgical Review, Oct. 1876.

arthritis. The smaller joints are those chiefly attacked by gout. The *differentia* of gout result from a deposit of urate of soda in the cartilage of a joint, where it looks like a patch (or patches) of opaque chalk. The cartilage eventually becomes thin and worn, and the gouty matter may encroach upon the bone. Joints are liable to gout very much in direct proportion to the severity of their mechanical friction, and the change of temperature they are subject to.

It was once a prevalent opinion that if invalids began to bathe in the King's bath the blood might be inflamed, and a fit of gout sometimes caused by stirring the humours and "exasperating the nervous juice." Dr. Saunders (1805) observed that when the Bath Waters were said to produce gout, it was meant that when persons have a gouty affection, "shifting from place to place and thereby much disordering the system, the internal and external use of the Waters would soon bring on a general increase of action." This would probably end in a regular fit of gout in the extremities—the "crisis always to be wished for." A case of "nodous gout" is given by Dr. Peirce in which the chalky nodes on the toes, fingers, and knees became red and soft by thermal bathing. Some of these little tumours opened of themselves; others were laid open by an instrument, and the concreted chalk

was picked out "little by little." Nodous deposits of urate of soda form around many of the smaller joints, especially of the hands; some approach the surface, and are discharged by ulceration. Some of the bursæ, especially that over the elbow, are often distended with chalky matter; and on these swellings are numerous white granules of urate of soda. The ultimate results of gout are often as crippling as those of rheumatism. Articulations may be ankylosed and otherwise deformed; the little joints may be flexed at all angles, and a large joint is occasionally swollen and almost immovable. The distortion of the hands and of the feet resembles nodular arthritis, and sometimes is distinguishable only by careful clinical inquiry.

Now a person is properly called gouty if he be liable to recurrent attacks of sudden (and more or less acute) joint-inflammation, which result in the deposit of urate of soda in the inflamed tissues. If the term "rheumatic gout" is ever to be used at all, it might be appropriated to the case of a gouty patient suffering arthritic attacks without any deposit of the salt. But the gouty inheritance, when once quickened and developed, is a long time in being hushed into dormancy again. And this constitutes the real difficulty of treating chronic gout by the Bath Waters. The old observation is quite true that paroxysmal arthritis may be newly

aroused by hot douches and baths. The seemingly latent activity is tolerably active still ; the enemy springs out of ambush and surprises us by his nimbleness to do mischief.\* Hence a study of the constitutional condition of a gouty patient is of unusual importance, and the soundness of all the great viscera ought to be thoroughly tested. It is here that the note of weakness and of disease is often found, impeding or delaying the metamorphosis and excretion of peccant matter. And the system of the Turkish baths renders good service when the Bath Waters are for any reason inapplicable.

Chronic gouty arthritis, uncomplicated by active or dangerous symptoms, may be alleviated by bathing and shampooing ; but morbid change of joint-structures is incurable when it has gone beyond a

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\* In the Mineral Water Hospital patients are often admitted for apparently chronic gout, and after one or two baths acute gout comes on. During 1873 a gentleman from Devonshire was under my care who suffered severely from febrile gout after only three or four bathings in the Thermal Waters. His health was afterwards greatly improved by the use of Turkish baths. Dr. Sutherland's lamentation (1763) is worth quoting :—"Never was the gout so frequent as at this day. Women and children are martyrs to a disease naturally peculiar to men. The English are more subject to gout than the inhabitants of any other country ; their children are ruined in the nursery, and their stomachs crammed in their cradles."

certain degree. The ultimate effects of gout are most deteriorating on the quality of blood and tissues ; and here the chalybeate principle of the Bath Waters may be turned to good account. That constitutional pravity which is one of the issues of gout may be to some extent corrected by tonic medicines, and by an abundant drinking of those "washing" and "cleansing" Waters which operate partly by their warm diluent influence. Active gout may entirely subside by lapse of time and age, but its pathological ravages disfigure and disable the body beyond medical repair.

### SECTION 3.

#### CEREBRO-SPINAL LESIONS OF SENSATION AND MOTION.

The most common lesion of sensation is NEURALGIA, and Sciatica is the form most often benefited by the application of the Thermal Waters. Formerly the diagnosis was vague between disease of the hip-joint and pain of the sciatic nerve; and sciatica was called hip-gout, or ache of the hip. Then there were cases of supposed sciatica which were what would be termed now psoas abscess, with a crooked leg and hectic symptoms. The grave error was sometimes committed of supposing a "hip-case" to be only sciatica ; but in an instance related by Dr. Charleton we can scarcely doubt the

existence of sciatica, as it is expressly stated that the pain was sharp in the knee, leg, and ankle. Every practical surgeon knows the occasional obscurity of this malady,\* and how difficult it is to be always quite sure that there is no disease of the sacro-iliac synchondrosis.

The position of the sciatic nerve among the muscles of locomotion exposes it to continual "drags and pulls," and if pain has been once set up in it the slightest amount of walking is sure to aggravate and keep it up. Unfortunately, too, the position of a large part of the nerve makes the sitting posture equally bad with locomotion. On the other hand, the superficial anatomy of the sciatic nerverenders it the more amenable to local treatment. Rest in bed or upon a couch in such a position as to take off all pressure from the nerve; is the first point to insist upon. Thermal bathing, with the dry and wet douche on alternate days, is often so effective that many sufferers are cured by it alone. But there will be no guarantee against a return of the complaint unless its etiology be studied in each in-

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\* This obscurity is owing partly to the large cutaneous surface which the great and small sciatic nerves supply with sensation. The diagnosis must be made between pure sciatica and myalgia of thigh muscles; rheumatism in the same parts; and (as Dr. Buzzard has pointed out) inflammation of the lymphatic spaces in the sciatic region.



stance. Gout, rheumatism, and malaria must be met by their appropriate medicines ; but the great majority of cases of sciatica are simple neuralgia (so far as neuralgia can be "simple"). There is a remarkable predominance of this neuralgia in the male sex ; and many elderly men afflicted with it are sent to our Mineral Water Hospital. They are mostly gardeners, agricultural labourers, quarrymen, or they have been engaged in some out-door occupation which implies exposure to weather and stooping of the body. In many of these persons the prognosis is not favourable. Beyond a certain age neuralgia often signifies degeneration of nerve-structure, and the habit of pain becomes very intractable. Therapeutic aid has to be sought from divers quarters ; including hypodermic morphia, acupuncture, galvanic electricity, and various methods of counter-irritation. The late Dr. Anstie had much confidence in the continuous current developed by a Stohrer's battery ; and in almost the last paper written before his lamented death, he gave specific instructions for the application of this remedy. In private practice the Thermal Water treatment of sciatica is almost always satisfactory.\* Sufficient

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\* Sir John Clobery, says Dr. Peirce, "got so well of his sciatica that, although employed by King James in Monmouth's business, and commanding a regiment, he had no return of his complaint."

rest can be enforced, and ample nutritional food and medicines are available. But any case may prove obstinate if medical management has been delayed too long.

The acute miseries of that complex condition called Lumbago are much alleviated by hot bathing and douching. Here, again, auxiliary means are often required; especially those which help to protect the skin of the back from changes of temperature.

Other forms of local pain sometimes yield to hydrotherapeutic measures. Pain and weakness after dislocation or fracture are relieved by bathing and pumping. It was a common notion, however, in former days that the strokes of the douche might drive a pain (as if an entity) from one part of the body to another. Various internal troubles attended by pain have been submitted to the thermal regimen of our baths. Drinking the Waters was reckoned a "specific" for asthma and other difficulties of breathing. The spasmodic agony arising from the passage of gall stones may be similarly alleviated, though anodyne medicines are usually required; but the Bath Waters must be avoided (said Dr. Charleton) when there is inflammation from

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The same author mentions the case of a Portuguese merchant of "note and probity," who had 3000 pumps for sciatica, and then hung up his crutches in triumph.

intemperance and excess. It was known more than a hundred years ago that the so-called Devonshire colic came from lead dissolved in the juice of apples during the manufacture of cyder. The great cause of this "fearful malady" was first made out by our distinguished countryman, Sir George Baker.\* Both he and Dr. John Hunter made inquiries which are recorded in their classical papers in the *Medical Transactions*; and it was shown by Dr. Hunter that the West Indian colic of that day was caused by the adulteration of rum with lead. Nearly all the home cases of "cyder colic" came (in Dr. Charleton's time) from Gloucestershire, Somersetshire, Devonshire, and Cornwall.

Pain is a part of the clinical history of many chronic maladies, and of few more than of the emotional disorder called Hysteria. A course of natural thermal baths is one of many agents which may soothe the nervous system, and raise the

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\* Dr. Andrew, in a letter to Sir George Baker (quoted by Mr. Spry), says that 285 patients were admitted into the Devon and Exeter Hospital in four years. "When the disease proves obstinate we always endeavour to get our patients into the Hospital at Bath; the Bath Waters, though not a specific, being esteemed by us the most effectual remedy, both externally and internally used." Testimony of a similar kind was given by Drs. Warren, Cooke, and Baynard.

tone of general health. Little can be done, however, when pain is distinctly a sign of disease of the great nerve-centres.

Hypochondriasis is a much more substantial complaint than is commonly supposed by non-medical persons. It is a neurosis which has for its principal feature a "mental depression occurring without apparently adequate cause;" and taking the shape either from the first, or very soon, of a "conviction in the patient's mind that he is the victim of serious bodily disease." In the nomenclature of the College of Physicians hypochondriasis is rightly classed as a disease in which there is disorder of the sensitive parts of the nervous system, but no disorder of the intellect. The patient "feels all wrong but understands all right;" and there is no perversion of the understanding, such as frees the insane from the responsibility of moral agency.\* Among the sensorial aberrations

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\* Dr. T. King Chambers (*Brit. Med. Journal*, July 5, 1873) has offered a study of John Bunyan's character as a type of hypochondriasis. In Bunyan's autobiography there is a plain tale of inward misery from boyhood up to his imprisonment in Bedford gaol, and which explains many passages in the "Pilgrim's Progress" that do not accord with the psychical experiences of healthy Christians. He says—"I beheld the condition of the dog and toad, and counted the estate of everything that God had made far better than this dreadful state of mine." No healthy man ever felt like that.

familiar to the hypochondriac are pseudo-dyspeptic symptoms, and burning pains in the course of particular superficial nerves. Or emotional excitement may set up severe functional disturbance in the great viscera, simulating actual organic disease; and if the family of the patient be tainted with insanity, the anomalous sensations may assume a type which approaches to hallucination or delusions. Now from time immemorial the Bath Waters have been counted "good for hypochondriac melancholy."\* Dr. Guidott tells the story of one troubled with this affliction, which indisposed much the stomach, spleen, and head. He drank the waters for five weeks and found a great alteration; getting a clear head and a good habit of body, very much to his satisfaction, for he "now digesteth well and thrives." In an old ballad entitled "An Easy Cure, or a prescription for an invalid at Bath," are the following lines:—

"If, brother Hyp, you want a cure,  
At Bath a lodging warm secure,  
Then drink the wholesome stream by rule."

A Bath worthy of the old school asks whether hypochondriasis has ever been heard of among

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\* In Burton's "Anatomy of Melancholy" are enumerated the symptoms of "windy hypochondriacal melancholy," with their causes and prognostics. (Tegg's Edition, 1849, p. 269.)

people of rude and inartificial habits? "The idea of an ancient Scythian or a modern Cossack in the Hyp! In point of respectability, hypochondriasis ranks next to gout!" Sir George Gibbes had a large practice here among this class of patients, and it is said that he often cured and always much relieved them by the skilful internal use of the Bath Waters. In two or three cases of this kind I have had the most encouraging results by allowing copious draughts of our Thermal Waters every day. But no medicine, natural or artificial, is of much use without judicious mental and emotional treatment. And for hypochondriac persons the happy "adjuncts" of a well-managed Spa form an excellent medicine; for who but eremites can resist the suasive influence of a pleasant journey, a total change of air and mode of life, perfect rest from harassing duties and occupations, and the agreeable stimulus of beautiful scenery?

PARALYSIS is a word which covers a large space of pathological ground. It is only a symptom, but a symptom which comes from the most diverse causes. In like manner Cough is a symptom which may be produced by conditions so different that some are quite unlike each other. In either case, it is the duty of the medical attendant to trace the effect back through a series of causes to the *vera causa* itself. The patient thinks most of his para-

lysis or his cough : but the physician or the surgeon is engaged in the necessary problem of seeking the origin of the morbid state before him.

The literature of this subject is perplexingly large and even contradictory. By the earlier physicians hemiplegia was called the *dead palsy* ;\* “one of the most stubborn distempers that we have to deal with,” said Dr. Peirce, “and longer in curing. It is not to be expected that the great shock a Fit of Apoplexy makes upon the nice and curious structure of the human body, should presently be set to rights again.” A less pronounced form of “dead palsy” was said to arise from pain, and after long fevers. Dr. Guidott described a “scorbutic palsy,” or hemiplegia from scurvy ; and one case of genuine paralysis is related in which the loss of sensation and motion was so complete that the sufferer “did not feel the top of his finger cut off, and did not perceive the want of a slipper on the foot.” But it can hardly be doubted that a vast number of other persons, reported to have “palsy,” were really afflicted with only the common sequels of febrile rheumatism or gout. One man, who had “hands and feet stupid and senseless,” got them soon restored to their perfect use ; and another, who had “palsy and weakness of the lower limbs,”

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\* That is to say, paralysis of both motion and sensation.

recovered in a month by the use of the King's bath. A country gentleman at Stratford-upon-Avon came to Bath on Midsummer Day, 1690, having lost the use of his right hand and arm for half a year ; he resorted to the King's and Queen's baths for only three weeks, and perfectly regained both sense and motion. There was a class of "paralytic complaints" alleged to be contracted by going into cold Water when "hot from labour ;" and the Bath Waters were said to be always very efficacious in "palsies arising from cold." Then there were other cases, the narrative of which lays stress on their "lameness," with an entire reticence as to its cause. A lady at Whitehaven was brought to Bath (end of 17th Century) "very lame from the hips downwards, with no sense or motion." She came from that great distance several years following, and "got gradually warmth, sense, and strength" in her limbs. The "withered members" so often spoken of might be the product of any disease withdrawing or restraining the muscles from common use. It seems clear, therefore, that the term "palsy" was formerly employed without much precision, and might mislead us in any scientific analysis of old cases.

The question soon passed from empiric observation to reasonable discussion. Dr. Charleton was puzzled by the fact that a most eminent physician



of the previous (the 17th) century highly extolled the efficacy of the Bath mineral springs in paralytic diseases, and that the most distinguished one in the current (or 18th) century interdicted the practice altogether. Dr. Willis was the former, and Dr. Mead the latter. Dr. Mead argued from the relaxing property of simple warm water, and in his *Monita Præcepta Medica* distinctly enunciated the doctrine—*immersiones calidæ paralyticis omnibus nocent*. “I know some,” said the doctor, “who after bathing died apoplectic.” The profession in Bath was alarmed and indignant. It was asked with much warmth—if bathing were dangerous, what must become of our guides? Here were the two Newmans, man and wife, “with nine score between them;” they were in the Water three hours every morning, and as long at night. And here was Mary Baker, aged 74, who had been a guide to the Hot and Cross baths for 26 years, and continued to go in every morning. Surely, exclaimed the chorus of physicians and apothecaries, the most respectable authority must give way to the force of facts! But even Dr. Charleton acknowledged the tradition that when limbs are relaxed by a long palsy, warm immersion tends to do harm.

Up to a little more than fifty years ago the pathological knowledge of paralysis was of the vaguest kind, and hence came most of the dis-

crepancies of opinion and practice. Thus at the end of the last century Dr. W. Falconer wrote that "as the Bath Waters are found to be of service in exciting motion of vessels when languid, they are likewise efficacious in cases of inertia of the nervous system. Paralytic disorders are obviously of this nature. And in these the Bath Waters have been found of the greatest service ; and if judiciously managed may be exhibited safely in most kinds of this complaint." To which Mr. Mansford rejoined in 1820 that "attacks of palsy are easily reproduced by causes which excite the vascular or nervous systems ; and the remaining power which the first attack had spared is swept away by a succeeding one. The work of destruction is finished by a fatal stroke of apoplexy, which is merely a graver affliction of the same kind which first produced the paralytic seizures." Upon such opposite theories of etiology were built exactly opposite plans of treatment. For as Dr. W. Falconer believed that "debility and defective nerve-energy were the sole causes of paralysis," he recommended patients to bathe in Water of 102 degrees, and even (when it can be borne) of 110 and 112 degrees. In the treatment of palsy (continued Dr. W. Falconer) the heat should be as great as can be borne, that the stimulus may be the greater. To which Mr. Mansford solemnly replied that "any one even in

health who chooses to immerse himself in Water of this temperature may form an idea of its effects on a weak and irritable brain. The force and the rate of the pulse are increased ; the respiration is hurried ; and the head is confused. Apoplexy may be re-induced." And Sir George Gibbes maintained that the records of the Mineral Water Hospital did not produce a conviction of the efficacy of the Bath Waters in paralytic affections. Some opinions of Dr. Heberden were frequently quoted :—" When the patient is judged to be pretty well out of the reach of present danger, he must in the next place be assisted in freeing himself from the several disagreeable relics of the former attack, and in preventing a return. For these purposes a journey to Bath is generally proposed ; about which physicians seem to be divided in their opinions ; some thinking that the drinking and bathing at Bath help to recover paralytics, while others are persuaded that they are the ready means of turning a palsy into an apoplexy. If I were to judge from my own experience, I should say that the Bath Waters do neither good nor harm to these patients ; some of whom gradually recover while they stay at Bath ; and others suffer a fresh attack and die there just as they would in any other place. I, therefore, cannot advise Bath ; but if it be desired by the invalids themselves or any of their friends, there is

no reason to hinder their going thither." Some statistics of the Mineral Water Hospital, related by Collinson (in his *History of Somerset*), cannot be very favourably interpreted. Out of 730 patients admitted into the Bath Hospital for palsy from no assignable or obvious cause, there were cured 87, much better 287, better 123, no better 202, dead 31. We may admire the candour, though not the sagacity, of the medical science which could discover "no assignable or obvious cause" of the disease in such a large number of cases. Warner quotes from a "Narrative, published by the Physicians of the Bath General Hospital in 1787," and which contains the following statement:—Condition of the Paralytic Patients in the Bath Hospital, from Jan. 1, 1776, to Dec. 31, 1785.

|                       |     |     |      |
|-----------------------|-----|-----|------|
| Whole number admitted | ... | ... | 1102 |
| Cured                 | ... | ... | 237  |
| Much better           | ... | ... | 454  |
| Better                | ... | ... | 142  |

The philosophical acumen of Dr. Barlow saw that the medical problem which required to be solved was, not so much the cause of the paralysis as the condition of the muscles after it. In a large number of chronic cases the remote cause of the paralysis is not of much moment, so far as the application of Thermal Waters is concerned. The

immediate or shock-like effect of that cause has long since passed away ; its ultimate effect is seen in those powerless muscles which, the longer they remain powerless, the less easy will it be to restore. And Dr. Barlow declared that the Bath Waters can do more than any other remedy towards the accomplishment of this end. He recommended temperate living and sedulous care in order to avert a recurrence of the attacks ; “plethora and fever” must be reduced and moderated ; even the internal use of mercury, with blood-letting and purging, might be requisite (according to Dr. Barlow) to soothe vascular action. Evidently Dr. W. Falconer and Mr. Mansford were (in one sense) both right and both wrong. Paralysis arises from the so-called apoplexy (or cerebral hæmorrhage), and from “white softening” and similar degenerative states. These are mentioned as typically antagonistic forms ; but there are intermediate morbid grades which Clinical Medicine understands and recognises. But however diligently we may inquire into, and perfectly grasp, the clinical history of an individual patient, we may have to do with a case in which all marks of the original lesion have long been effaced. Before us stands or lies the paralytic man or woman ; and whatever may have been its origin, their paralysis now means simple debility. I exclude from consideration at present all those

kinds of palsy which proceed from mineral poisoning, and which will be discussed a little further on. I want to make it clear that, after the lapse of a variable time, Paralysis means Debility for all therapeutic purposes ; and it is our duty to find out whether this debility can be partly removed or wholly cured.

Any paralytic person, therefore, who is proposed for thermal treatment at Bath must submit to examination on two cardinal points :—(a) What is the condition of the great viscera and of the larger blood-vessels ? and (b) What are the physical bulk and the electric contractility of the paralysed muscles ? On the former point we may agree with most of the suggestions and special directions of the older writers. All active symptoms must be subdued, and any irritability of circulation ought to have passed away. To talk about “preparation” in these cases is irrelevant, and even absurd. If time and quiet and rest have not made the body ready, the patient is intrinsically unfit for thermal remedies at all. Evidence may be gathered from the state of the heart and of the kidneys that no lasting benefit can be expected from anything : and that under a seeming quiescence danger is constantly lurking. A persistence of the same morbid conditions would show that the enemy can never be very far off. But if a satisfactory medical answer

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can be given to the first of the above questions, the state of the muscles may be viewed with the purely surgical eye. We shall notice whether they are wasted ; whether one group overmasters another and is contracted by spasm ; and, in general terms, what is their *tone* ? It is a favourable omen if a patient exhibit signs of returning power in the muscles along with a steady improvement in constitutional health. To help Nature in what she is seeking to do is our clear and imperative duty ; and if the opportunity do not occur to-day, it may to-morrow or some weeks hence. The sound advice has been given that every paralytic should devote a quarter of an hour twice a day, even when loss of power is well nigh complete, to trying to make the muscles obey the will.

*As a rule, whenever Electrification contributes to the cure of paralysis, the external use of the Bath Waters may be considered advisable.* Thus in a case of hemiplegia (from brain disease) it is the rule not to apply electricity until some months (four to six) have elapsed : and then we must ask ourselves whether the persistence of the hemiplegia arises "from the muscles having lost their old aptitude of response to the influence of the will, or from the cicatrix or cyst exercising positive pressure upon the cerebral tissue." Early rigidity of muscles positively forbids the application of any

form of electricity. When the muscles are lax and feeble the paralysis is usually localised in them, and Faradisation is applicable. But there are many other degrees of lesion which may be benefited; and in "almost all cases in which after a spontaneous partial return of voluntary movement the patient suddenly stops short, and for many weeks or months makes no further progress, Faradisation comes in and the immediate good that it will often do is surprising."\* The late rigidity of hemiplegia is equally capable of relief by the continuous or galvanic current. Now every case in which we may expect to do good by electricity can almost always be helped by thermal bathing and douching. The invalid should bathe first in a most moderate way; that is to say, the duration of the bath must be moderate and its temperature comparatively low. The reclining bath may be used, if necessary. Gradually the discipline may be increased, but always with the greatest caution; fluctuations in the number and tension of the pulse should be noticed; and in rare instances it may be desirable for a medical man to attend the patient during the first bath. And if there be distinct intolerance of any bathing whatever, our operations must be limited to douching and friction of the paralysed

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\* Dr. Tibbits' "Handbook of Medical Electricity," pp. 122, 123.  
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limbs. What we have to do is to rouse the muscles into life, and to get out of them that energy which has been for a time more or less dormant.

I spoke just now of the electric contractility of muscle. By this simple physiological test we discover how much life a muscle has, and to what degree it is likely to respond to our therapeutic stimuli. Contractility is retained in most cases of cerebral and ordinary spinal paralysis (in the latter it is sometimes exalted). Loss of contractility commonly occurs to some extent in muscles that have been long disused, simply in consequence of that disuse. And when atrophic or degenerative changes are going on in muscles, their electric contractility is necessarily impaired proportionately to the amount of destruction which has taken place. And this loss is most apparent when the paralysis has come from disease involving either the nerve-nuclei, or the nerves connected with the paralysed muscles. To the rules thus broadly stated there are exceptions understood by the medical electrician; but we are able to determine that no thermal treatment is likely to be of any avail in the ultimate stage of wasting palsy, for the valid reason that the muscles themselves are ruined. The muscles are not wasted because weak, but weak because wasted. What is termed hysterical paralysis (whether in man or woman) is a question

rather of nerves than of muscles ; and provided that an appropriate general regimen be adopted, few disorders yield sooner and more completely to local treatment, electrical or thermal. One of the older physicians relates what is probably a case of hysterical or emotional paralysis when he speaks of a clergyman who came to Bath so disabled in voice that he "could hardly be heard to speak in a wide chamber, but before he went away he preached in our large church with great applause." In the grave condition called Paraplegia electrification is sometimes beneficial when active disease has passed away, especially if there be a "persisting localised paralysis;" and at the same time muscular action may be evoked by bathing, douching, and shampooing. Many cases which seem to have been more or less of the nature of paraplegia are recorded. But everything depends on the central nerve-lesion from which this form of paralysis proceeds.\*

The following case, humorously told by an author nearly two hundred years ago, has some relationship to what is now called "locomotor ataxy."

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\* Opposite the title page of Dr. Tunstall's volume on the "Bath Waters" (fourth edition, 1868), is a statistical table, showing the proportion of cases cured and relieved. Fewer cases of hemiplegia than of paraplegia are said to be benefited, which does not accord with my own experience.

Several persons saw a "seemingly lusty and well-limbed fellow that could run, but not go or stand unless leaning against a wall or post. When he would remove from one place to another he would set himself a-running, and run against a wall or post, and there stop awhile. He would then set his face to that quarter that he designed to be at, for he could not turn at the corner of a street, but must move directly forward. Many spectators were drawn together by the unusualness of the thing, and gave him their charities." The man is said to have recovered; but with the fully developed locomotor ataxy (as we now understand it) all remedies are nearly powerless.

Another variety of paralysis was associated with vertebræ that were "started." In a case related by the author of the one just quoted, we are informed that "four or five vertebræ were out, which should have been held together by ligaments. The lower limbs were useless and senseless. The patient felt neither nipping nor pinching, nor would he have felt a nail driven into his foot or leg. It was six months before there was much benefit, and then the limbs began to be ticklish. One day he (the patient) said that he could wag one of his toes, then two or three; then a whole foot, lastly the other also. In less than another month both sense and motion of all the lower parts returned by

degrees. He crawled about his room with chairs, and then with crutches. Soon he was able to walk two or three miles in the morning, although the vertebræ were still out. All this illness came from an epidemic fever." A similar instance is recorded (in April, 1665) of a young daughter of one of the King's Court judges. She recovered in a year, and the landlady, "following her to London because all her debt was not paid, met her walking nimbly in the London streets." Medical men are tolerably familiar with the palsy of the lower limbs which arises from posterior curvature of the dorsal vertebræ ; but the spinal cord generally accommodates itself after a time to its new position, and the physiological effects of pressure pass away. The one thing necessary is rest rather than bathing. Dr. Charleton describes a "distortion of vertebræ from pain," for which a very severe treatment was prescribed. "After ten or twelve bathings," the Doctor writes, "the patient should be suspended in a swing, sometimes by the neck, sometimes by the feet." The operation of the swing is said to have been extremely painful (which we can well believe), and so the instruction was added that the patient must be put carefully into the swing, and be allowed to stay in it a very short time. The emotions of wonder and pity are exercised about the nature of the complaint, and the barbarous

treatment of the unhappy victim. But the "chyrurgeons" of Bath recommended the thermal treatment of even traumatic dislocation of the vertebræ, and its accompanying paralysis. Thus Dr. Charleton tells us that one John Waterman fell from a loaded wagon and had the third and fourth vertebræ of his neck "distorted, becoming paralytic in a few hours." Six months afterwards, the bones were still out of place, and the symptoms of palsy remained. Pumping on the neck caused almost immediate relief; "for as the displaced vertebræ slid gradually back again into their natural situation, the perfect use and feeling of the lower limbs returned." The medico-chirurgical science of our own day would like to know the trick by which such wonders were performed.

No benefit is likely to be done by any Mineral Water in cases of general spinal paralysis, arising either from disseminated sclerosis or from low inflammation. Whether any benefit can be accomplished for infantile paralysis, or the essential paralysis of children, depends upon the stage in which the disease is submitted to treatment. All febrile symptoms must pass away, and there must be evidence that inflammatory mischief has entirely subsided. The affected muscles may (according to Dr. Bristowe) be divided into three categories: (*a*), those which, although paralysed, have their electric

contractility but slightly injured ; (*b*) those in which the electric contractility is much enfeebled ; and (*c*) those which fail to respond to the action of any form of electricity. In the last case the muscles waste rapidly, and almost always fail to show any kind of improvement. In the other two cases more or less amelioration can be brought about by the use of the continuous electric current, combined with the careful and systematic use of thermal douching and bathing.\* Children afflicted with

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\* A small son of a Colonel Farewell, æt. five or six, was brought to Bath in May, 1691. The case is thus related by his physician, and seems to have been of the nature of Essential Paralysis :—the child was found sitting upon a table, looking plump and fresh. When the nurse let him down, there appeared a weakness of the back and a contraction of the lower limbs ; insomuch that they were so far from supporting him that he could not by himself extend a leg nor suffer it to be extended by another. He would crawl up and down upon a table or a floor, being active and willing to play. He ate and drank and slept. He bathed at first twice a week, then every other day, and finally every day except Sundays. For six weeks there was very little alteration. Then it was observed that he could erect himself a little more than at first, and suffered his legs to be drawn out in the bath by the guides. After ten weeks' stay at Bath he returned home, and the improvement went on. He came again in August, 1693 ; he was then able to run about, and to play at trap and top and scourge with other boys.

The case of Mrs. Elizabeth Waller, already slightly alluded to, is told by Dr. Peirce with dramatic power ; and her recovery would be considered wonderful even at the present day.

rickets and its attendant evils were commonly brought to Bath at the end of the seventeenth century.\* Thus the indefatigable Dr. Peirce records that a young man came to Bath who was seemingly consumptive, thin, pale and hectic; relaxed in joints, crooked in the legs, and growing aside in the body. His doctors and nurses had put him in armour, with iron bodice and half boots; a sprig of iron to keep his ankles from turning outwards, and the same over the knees to keep them from turning inwards; with a device to allow for the bending of each joint. The whole was braced on with leathers, which were drawn together with laces. The patient was in a "deplorable condition;" but after preparation he bathed moderately in a very fitting temperate bath. According as he was able to bear it he bathed more frequently, stayed in the baths a longer time, and permitted their temperature to be increased. At first he remained here only six weeks;

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\* Bathing and drinking Bath Waters (says Dr. Oliver) are adapted to the soft and tender nature of women and children. In speaking of the supposed difference in the virtue of the various hot springs, I omitted to mention that Dr. Stevens actually classified diseases according as he imagined them to be best treated by one spring or another. It is proper to say here that from deference to the sex of the reigning sovereign, the name "King's bath" is for the present cancelled; and all the baths adjacent to the Grand Pump Room are now known by the common denomination of Queen's baths.

but he came again the next year and in each of the following years until he recovered strength, and got a better habit of body. The possibility of curing paralysis after convulsions is illustrated by another case of Dr. Peirce's, a child of three years of age, who lost all the use of her left side after several "fits," but made a complete recovery by repeated bathings.

It is an aphorism almost respectable for its antiquity that many local palsies (*paralysis partialis*) are treated in a very advantageous way by thermal methods. That special local weakness which arises from lead poisoning has ever found a congenial home in the Mineral Water Hospital. Sir George Gibbes was justified in saying that nothing can be better than the effects of the Bath Waters in the treatment of this palsy ; for they not only help to expel the noxious mineral from the body, but they obviate the deleterious effects produced by its lodgment there. The only mineral (continues the same writer) friendly to the human constitution is iron, which seems to be an antidote to the effects of the lead. Sufferers from this disabling malady enjoy in the hospital a period of continued rest, a long holiday from an injurious trade, and vigorous splashings and cleansings with a hot mineral Water.\* For the sake of its chaly-

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\* Dr. W. Falconer's statistics in the last century would hardly



beate properties the Water may be drunk largely, and other medicines are sometimes desirable. Galvanic electricity is a spur to inactive muscles. But many patients do not come to Bath until the paralysis has lasted several months, and numerous remedies have been tried; and consequently the average duration of a sojourn in the Hospital is made proportionately longer.\* That want of power which is caused by local neuritis, and the motor weakness which follows a long attack of sciatica, may be treated by local bathing and douching. It is hardly necessary to say that the general paralysis which accompanies chronic disease of the brain is

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be rivalled even now. He says that the "number of patients admitted into the Hospital for this complaint [lead-palsy] from January 1, 1776, to December 31, 1785, were 264; and of these 117 were cured, 138 were much better, 5 were better, 2 no better, and only 2 dead."

\* Dr. Charleton tells us something which may interest the present Medical staff of the Bristol Infirmary. Five or six persons from Dunster, having a palsy of the hands from cyder drinking, were cured by the Bath Waters after being discharged from the Bristol Infirmary without benefit.

The influence of lead as a predisposing cause of gout was established in the last century, and has been confirmed in more recent times by Drs. Parry and Todd. Dr. Garrod believes that the converse holds good also; and that persons either subject to, or strongly inheriting, gout, are more readily influenced by lead than others.

never ameliorated by any kind of baths. I have no experience of the pseudo-hypertrophic paralysis of Duchenne, although that writer says that the disease may be sometimes arrested or cured in its first stage by bathing and shampooing. It must be remembered that paralysis now and then gives rise to distortions closely resembling those which have been occasioned by spasm ; and gymnastic exercises are opportunely used when they help thermal means in undoing these distortions.

I pass to a brief account of that large group of motorial disturbances, the SPASMODIC NEUROSES,\* and their treatment by the Bath Waters.

The to-and-fro spasm, or the so-called shaking palsy, is rarely (if ever) made better by thermal baths or douches. Dr. Charleton admitted this, but was inclined to except those "shaking palsies which are the consequence of an imperfect crisis of some acute disease, or of suppressed gout." Dr. Summers said that the disease is seldom benefited by bathing, and is generally rendered even worse by drinking the Waters. Most modern practitioners would ratify these opinions, and would include in the same category those tremors which are the result of mercurial poisoning.

The cumulative spasm is represented by wry-neck,

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\* I adopt the excellent nomenclature suggested by Dr. Hilton Fagge.

and by similar affections of other parts of the body. A case of clonic wry-neck in a young girl was sent to the Mineral Water Hospital about three years ago, but she was dismissed without relief. I am not aware that there is any radical cure for this spasm but tenotomy, or at the least a proper mechanical appliance.

Chorea is the typical form of the co-ordinated spasm. *Quoad* heat and moisture, the Bath Waters supply a convenient means of soothing and refreshing an irritable nervous system; but I cannot maintain the thesis that any mineral Water has specific properties for removing the nerve-lesion on which chorea depends. A poor choreic child may be taken from a place ironically called a home, where it is sometimes starved, and often terrified and even ill-used; and it is put into another place called a hospital, where there is the constant exercise of charity and mercy towards the mind and body. Everything around is new and kind, and perhaps for the first time habits of cleanliness and order are enforced. Add to these good food and nutritional medicine, and the tranquillising influence of regular warm baths, and the wonder would be if most cases of chronic chorea did not speedily amend. In one of the medical journals last spring (1876) some interesting cases of chorea are reported in the practice of the North Eastern Hospital for

Children, London. It is related of four children that they did not get on at all as out-patients ; but directly they enjoyed the privileges of "rest and full diet" as in-patients, an improvement immediately began, and they were soon well. In one instance it is especially recorded that the same medicinal treatment was continued throughout. Dr. Peirce quotes the case of a child aged 13, subject to various and strange fits, with irregular movements in the arms and hands, legs and feet ; and sometimes there was a random talking. In five or six weeks the child "could walk, talk, and carry himself composedly ;" and most of the benefit was attributed to the bathing. Nearly all choreic children thrive under the regimen of the Mineral Water Hospital ; and to many we prescribe iron, and arsenic, and cod-liver oil. Rhythmic muscular exercises, especially the use of the skipping-rope, are much to be commended.\*

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\* In every case of Chorea the heart should be especially examined. If the disease be associated with rheumatism, there is the more reason for treatment by the Bath Thermal Waters.

Dr. Stevens (1758) says :—"A great many People think, that when Patients are troubled with this Disease [Chorea], they are either possessed with the Devil, or bewitched ; and instead of going to a Physician to get relief, will go to some learned Clergyman, and endeavour to get rid of the Disease by Prayers and Tears." Dr. Stevens' *Treatise on the Medicinal Qualities of Bath Waters* was dedicated to the Right Honourable Wm. Pitt, Esquire.

## SECTION 4.

## DISEASES OF THE SKIN.

The "medicinal stream" of the Bath Thermal Waters has had an ancient repute in the treatment of Diseases of the Skin. Without any aid from external or internal medicine (properly so called), these Waters (used in the form of baths) help the purifying function of the skin-glands, and strip away the dying or dead epidermic cells whose shortened life constitutes the essence of many chronic skin disorders. True it is that this can be partially done by any sort of warm baths : but the mineral constituents of a Mineral Water modify its other physical qualities. And the influence of these is greatly enhanced by mere bulk of fluid, and by the systematic use of splashing, douching, and friction.

Our therapeutic object, then, is to improve the textural nutrition of the cutaneous surface. There is scarcely an organ of the body which has not been the battle-ground of solidism and humoralism ; and the poor skin has been dreadfully vilified as the channel by which countless poisons have been supposed to make their way out of the body. There is very little evidence of the existence of any such poisons, and we shall take a more practical and logical view of the matter by looking on most

diseases of the skin as the result of tissue-irritation or of abnormal tissue-growth. And our aim should be to soothe this irritation and to check this growth.

In this place I have to speak only of chronic eruptions of the skin. Dr. Barlow distinguished them into indolent and irritable as a basis for treatment ; but for my present therapeutic purpose they are best divided into two groups, a dry group and a moist group.

In the dry group of skin diseases, the genus Psoriasis (*Lepra Alphos* of Erasmus Wilson) occupies the first and typical position. In the medical literature of the Bath Waters during the eighteenth century there are many records of the successful treatment of scaly eruptions of the skin : and in the confused nomenclature of this subject which prevailed before Willan's time, these eruptions were commonly called "leprous." The preponderance of this class of cases was quite remarkable. Dr. Oliver gives the history of a number of such patients as they were admitted into the Mineral Water Hospital ; and the symptoms are related with a precision of clinical detail so characteristic of the "old masters." Let the narrative of three cases suffice. In July, 1758, a young man named Wingrove, living at Norton St. Philip, was received into the Hospital. He was suffering from "leprosy,"

which meant that he had a "branny scurf, as white as snow ; it began on the right elbow and spread to the knees, hands, fingers, feet, and toes." Here and there the eruptions began to "burst, chap, and bleed." After a preparatory course the patient duly bathed in the Waters, and was discharged cured on January 10, 1759.—Elizabeth Jordan, aged 16, having a "leprous complaint," was sent to the Hospital in May, 1758, by Dr. John Andree, physician to the London Hospital. She had a "white farinaceous crust," which began in "small red spots about the knees." The scales continually fell off, and were succeeded by fresh ones. They afterwards appeared on the "elbows, wrists, and the outside of the arms and legs ;" and the "crust itched intolerably." She bathed as usual after being bled and purged, and was dismissed well in January, 1759.—Mary Tomkins, aged 22, was suffering from "confirmed leprosy" all over her body. All kinds of physic had been tried in vain, and she had been turned out incurable from St. Bartholomew's Hospital: "no person would take her into their house" (October, 1763). Her state is suggested as resembling elephantiasis. The leprous scabs were rendered "soft and supple" by bathing ; within eight months they were cleared away, and only dark-coloured marks were left on the skin. This person was bled and purged, and occasionally

took alterative medicines ; and an ointment made of tar and neat's-foot oil was applied to the skin.

An interesting summary is given by Dr. Oliver of cutaneous cases admitted into the Hospital between May, 1752, and May, 1764.\* 241 lepers were received, of whom 122 were "perfectly cleansed ;" 85 were much benefited ; 12 were not benefited at all ; 4 died ; the treatment in 11 cases was discontinued because improper ; 7 were discharged for irregularity. Both Guidott and Peirce attest the "very great cures done in foulness of the blood, and in leprous and scurvy persons." But I have adduced enough to illustrate the traditional virtue ascribed to the thermal Waters of Bath in the treatment of the "dry" skin diseases. A special value belongs to these observations in one respect, namely, that there was no "specific" treatment then in vogue at all. Even the use of outward applications was the exception to the rule. It may be noticed that the management of the severer cases was very protracted, and probably might have been shortened if other therapeutic means had been simultaneously used. The comparatively rapid success in other cases, however, may favourably

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\* I take this opportunity of saying that a summary of the rules for the admission of patients into the Mineral Water Hospital is to be found in a pleasant volume, entitled "Rambles about Bath" (1876), p. 71.



vie with the results which we obtain at the present day.

Numerous persons suffering from cutaneous disease are still admitted into the Mineral Water Hospital ; and a large proportion of this disease is a variety of psoriasis, more or less pronounced and extensive. All ages and occupations are represented, and there is no marked predominance of sex. The medical history of many of these cases is this :—Every orthodox plan has been skilfully and patiently tried, including nearly always a prolonged administration of arsenic, and still a cure seems as far off as ever ; or if there ever has been a complete disappearance of the eruption, it has returned in a little while with all its old obstinacy. These features are observed in all sorts and conditions of men. In the case of poor people, the Hospital is a beneficent harbour for the reception of patients whose occupations are inimical to any steady treatment, or unfavourable to the prospects of permanent success. Better elements of hygiene are provided ; rest is enforced ; and the skin is protected from those vicissitudes of temperature which injure its healthy functions. During his sojourn in the Water the patient must rub the affected parts of the skin with his hands or a flesh-brush, so as to remove as much *exuviae* as he can. A speedy amendment usually occurs even

in that form distinguished by the defiant title of *Psoriasis inveterata*. Thickening of the subcutaneous connective tissue gradually subsides ; the accompanying irritation diminishes ; and while the patches of clear skin become more marked, and old spots become fainter, the general health is strikingly improved. Progress is facilitated by the administration at the same time of iron and arsenical medicines, and (whenever possible) cod-liver oil. And these auxiliaries should be continued for some time after a person leaves Bath, for the purpose of maintaining the good already done. Circumstances may require the prescription of that fine old "alterative," the Perchloride of Mercury ; and the outward inunction of tar is now and then a disagreeable necessity.

The application of the Bath Waters to the moist group of skin diseases (formerly called "scorbutic"), is not commonly attended with anything like the same success. And we possess superior remedies in the excellent ointments of lead specified in the "British Pharmacopœia." When one of these ointments is applied to the legs—the chosen seat of chronic eczema—and the limb is properly supported with a bandage, the benefit obtained is often quick and lasting. And as impervious coverings are wholly unsuitable, it is clearly a troublesome process to keep lint or flannel constantly wet,

whether with thermal Water or any other medicated lotion.

All papular and pruriginous eruptions are alleviated by Water and Vapour baths. Cases of contagious diseases of the skin are not admitted into the Mineral Water Hospital, and demand specific treatment in other ways. Guidott reports that a person suffering from "Nettle-rash" had seven baths, and drank seven to nine pints of Thermal Water *per diem* for three weeks, and was finally cured. During the autumn of 1869, I had under my private care a case of universal *Pityriasis Rubra*, accompanied by fearful irritation and nervous depression; tepid and hot baths were carefully applied alternately with baths of medicated vapour, but without the slightest utility. Nothing gave any relief but hypodermic morphia, and the patient ultimately died. Two or three typical examples of *Scleroderma* have entered the Mineral Water Hospital within the last seven years; and we have had the opportunities of studying this extraordinary disease, though able to do little for it. But Dr. Baylies gives an account (1757) of some one, "all the humours" of whose body "acquired such a tendency to petrification, as to render him scarcely capable of the least motion;" and yet he was discharged "perfectly cured."

Seborrhæa, or Sebaceous flux, arises from irritation or hypertrophy of the sebaceous-glands. The disease occurs on limited areas of skin; the secretion is more solid than it should be, and with the superficial epidermis concretes into greasy flakes which adhere to the surface. A common seat of Seborrhæa is some part of the face, where it shows itself in the form of little yellowish thin crusts: but on the leg the disease may be exhibited by large fatty plates developed on a thin cachectic skin. Dr. Tilbury Fox notices the occasional resemblance of Seborrhæa to ichthyosis; in the former, however, the skin is healthy, while in the latter there is a general disorder of cutaneous structures. I describe this superficial disease of Seborrhæa because it is so easily managed by the outward use of the Bath Waters. The fatty scales become softened and are gradually detached; and the function of the glands is restored to a more natural state by the soothing alkaline qualities of the thermal fluid with which the skin is bathed.

When gout or any other diathetic condition is at the root of a disease of the skin, it must be met by the drinking of the Waters or some other appropriate medicinal treatment.

## SECTION 5.

SUNDRY DISEASES AND DISORDERS IN WHICH THE  
EXTERNAL AND INTERNAL USE OF THE BATH  
THERMAL WATERS HAS BEEN EMPLOYED.

The name of these diseases and disorders is almost legion, and the subject is to a large extent only of antiquarian interest. Many were the stomach infirmities for which the internal use of the Waters was reckoned a sure specific ; thus one physician recommended them for "violent pains and sour corroding eructations," and others thought highly of the springs for the disorders of digestion which precede gout. For centuries there was no medicine like the Bath Waters for troubles about the liver,\* especially those which arise "from the irregularities of a soldier's life (especially in the Indies), knocking up the constitution ; and accompanied by a yellow cachexy, vomitings, and diarrhoea."† Thirst and

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\* It was satirically said by one of the medical brotherhood here that "these two words, bilious and nervous, are a sort of paper-currency in the medical world ; they save the credit of many a bankrupt in real knowledge, and give a false value to remedies which, if the deception were unmasked, would show their base metal. Withdraw these terms from circulation, and half the trade of empiricism dies at once."

† Dr. Quinton spoke of the Bath Waters as being "very good in East Indian gripes and cholicks." What great cures,

heartburn were said to be alleviated, and internal spasmodic pains.\* A number of people suffering from dropsy flocked to our Thermal Waters, and Dr. Peirce describes one poor fellow as very thankful because his clothes were gradually made less, and his shoes of smaller size ; he recovered “ to a miracle ” within two months. But the dropsy which comes from alcoholic intemperance was not considered so tractable. Heberden was charitable enough to suppose that the Bath Waters are “ specially efficacious in curing the complaints caused by hard drinking, if applied to in time, before the liver and the stomach are too much hurt.”

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continues the Doctor, “ have been, and are daily, made by Drinking the Bath Waters hot from the pump, *res ipsa loquitur* ; for the Cures would speak themselves, were Men mute ; for the fame of those streams has not only run all the kingdom over, but even beyond Sea too.” Dr. Quinon practised at Oxford, and went to Bath every summer for nearly 30 years “ in order to see the deplorable cases cured there.” His book is entitled “ A Treatise of Warm Bath Water, and of Cures made lately at Bath in Somersetshire, plainly proving that it is more probable to cure Diseases by Drinking Warm Mineral Waters, and Bathing in them, than in Cold Mineral Waters ;” Oxford, 1733. Some cases related in this volume would be worth quoting, if I had room. For an inspection of this and one or two other rare books I am indebted to the kindness of Mr. Frederick Shum.

\* The “ antispasmodic qualities ” of Bath Thermal Waters are celebrated by several writers of the last century.

And Sir George Gibbes thought that the same Waters are useful in enabling drunkards to leave off drinking; for, said he, the stomach is so warmed and comforted that the "coldness and anxiety are relieved which compel a strong drinker to fly to strong liquors." We are, I fear, asked to credit what borders on the miraculous when Guidott declares that a person suffering from "running ulcers all over the body" was cured by a course of bathing in six weeks. But convalescents who could not shake off the remains of the ague (so common in country districts two centuries ago), and had a persisting "coldness and trembling," were often remitted to the care of doctors who had a "Bath practice." And the internal use of the Bath Waters was formerly advised for the relief of scrofula, or the "King's evil."

With more propriety any prolonged anæmia which is independent of organic disease may be treated with the prescription of a moderate dose of the Thermal Water twice a day. Convalescence from a weakening or wasting disease is helped by the same means. Dr. Granville's memorandum of an occasional dose of Carlsbad salts or of cream of tartar, should be kept in mind. The state of invalids whose health is impaired by disease of bones, chronic inflammation of joints, and caries or necrosis, resembles (as Dr. Braun points out) that of

retarded convalescence ; and a modified Thermal treatment not only upholds the strength, but may improve the nutrition of the diseased part by generally increasing tissue-change. Dr. Weber does not conceal his wonder that a military sanatorium has not been established in Bath for rheumatic and gouty complaints, and for the effects of wounds and accidents in soldiers. Finally, the judicious use of warm baths adds to the enjoyment of life, and retards the advance of those infirmities naturally incident to old age. A mediæval author proclaimed the Bath Waters to be good for "lethargy," "forgetfulness," and even mental "craziness"; if this were true, surely there would be more candidates for the baths than there would be Water to bathe in ! Dr. Darwin, in his famous *Zoonomia*, indulges in a little poetry on this subject, and recommends the frequent use of the bath when we become thin and worn. And so we will hope that a few beams from *Aquæ Solis* will give lustre and comfort to the inevitable evening of life.\* I

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\* I am quite aware of the demolition of this bit of poetry by the Antiquaries. Prebendary Earle (*A Guide to the Knowledge of Bath, Ancient and Modern*) tells the story thus :—"In the itinerary of Antoninus we find Bath under the name of *Aquæ Solis*, i.e., *The Waters of the Sun*, and we might have been content to see in this a mere Roman designation totally excluding the knowledge of any previous name, and superseding any native



conclude with the quaint and true words of Dr. Jorden :—"Wherefore, when we speak of any Mineral Water, or of any other medicine that is proper for such and such a grief, we must be so understood that the medicine is not wise enough to cure the disease of itself, no more than a sword is able of itself to defend a man, or to offend his enemy, but according to the right and skilful use of it. It is true that we have general rules to guide us in the cure of diseases, which are very true and certain ; yet when we come to apply them to particular persons and several constitutions, these general rules are not sufficient to make a cure, but it must be varied according to circumstance. And this is enough to intimate generally concerning the uses of our Mineral Waters."

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associations which had belonged to this locality before the Romans came. . . . It seems clear from the inscribed stones that have been from time to time dug out in various parts of Bath, that under this name *Salis* we have something more interesting to us than the genitive case of *Sol*, the Sun. It is found spelt *Sul* in the connection *deæ Sul-Minervæ*, which shows that it was the name of a divinity, and that this *Sul* was identified in attributions with the Roman's Minerva."

# APPENDIX.



## APPENDIX.

### THE CLIMATE OF BATH.

BY THE REV. LEONARD BLOMEFIELD, M.A., F.L.S., F.G.S.

*Results of Meteorological Observations made at the Bath Royal Literary and Scientific Institution, during ten years commencing with March, 1865, and ending with February, 1875. From the Proceedings of the "Bath Natural History and Antiquarian Field Club."*

"The Bath climate, or the tract of country over which it extends, would seem to commence, coming from London, on the Bath side of the Box-tunnel on the line of the Great Western Railway. Of this I had, some years back, a remarkable illustration. On occasion of taking the train from Oxford to Bath during some severe weather in the month of November, snow began to fall immediately on quitting the Oxford station, and the fall kept increasing the whole way to Box. On entering the tunnel it was still falling thick, and the ground was quite covered; but on the train emerging from the tunnel at the other end, it was found to be raining instead of snowing and the fields were green. At Bath no snow fell all that day.

"The following results were obtained from the meteorological observations made at the Bath Literary Institution. Those that are generally first treated of in a paper of this kind relating to climate are the Barometric observations. The

mean height of the Barometer for ten years from March 1st, 1865, as determined by the old instrument, and corrected to sea level, is 29.994 inc. The greatest observed height during the ten years was 30.777 inc., on December 15th, 1865. The lowest observed height was 28.400 inc., on January 20th, 1873; giving a range of 2.370 inc. The greatest yearly height occurred four times in December, twice in March, and once in each of the months of January, February, April and November. The lowest yearly height occurred four times in January, twice in February, twice in December, once in October and once in November. From this it appears clearly that the extremes of high and low barometer occur mostly in the winter, and never in any of the summer months, in which the range of the mercurial column is comparatively small.

"I will now speak more in detail of other results relating to temperature, humidity, and the rainfall.

"The Bath climate—although it has a slightly higher mean *temperature* than several other English towns in about the same latitude, or not very much N. or S. of that latitude,—owes its chief distinction to its more temperate character, or to its extremes of heat and cold lying within a more contracted range, notably the fact both in very hot and very cold seasons.

"The mean temperature of Bath, deduced from nine years' observations, 1866-74, is  $50^{\circ}5$ . The result is exactly the same, if deduced from ten years' observations, commencing with March 1st, 1865, and ending with February 28th, 1875. The highest yearly mean during the above nine years was  $52^{\circ}0$ , in 1868. The lowest yearly mean was  $49^{\circ}4$ , in 1870. The range of the mean, therefore, may be set at  $2^{\circ}6$ . Five of the nine years were above the mean, viz.:—1866, 1868, 1869, 1872 and 1874. Four were below the mean, viz.:—1867, 1870, 1871 and 1873. The year making the nearest approach to the exact mean was 1869. In 1868, the hottest year in the series, seven months were above the

mean *monthly* temperature, viz. :—March, May, June, July, August, September and December. In 1870, the coldest year in the series, six months were below the mean monthly temperature, viz. :—January, February, March, September, November and December. And it is noticeable that in the former instance, the months in excess occur chiefly in the spring and summer, while in the latter instance, the months in deficiency occur chiefly in the autumn and winter. Hence, in a general way, not only does the excess of mean temperature in one of these years balance the deficiency in the other, but the balance would seem to be kept up as regards the particular months in which the excess and deficiency respectively occur.

“If now we confine our attention to the monthly means, it will be seen that the mean temperature rises very slowly from January to March, but makes a sudden and considerable advance in the months of April and May. It then makes another and almost as great an advance in June, and the same again in July, in which month it attains its maximum. The mean temperature of August is but little below that of July. There is a decided fall in September and October, and a still more marked fall in November, the mean temperature of this last month being scarcely 3° above that of December when the mean is at a minimum. It is worthy of remark that while the ascent of the mean temperature from the minimum to the maximum takes seven months, the descent from the maximum to the minimum takes only five. In other words the passage from winter to summer is much slower and longer about than the passage from summer to winter; though in this last case, from the fall of temperature being not very rapid during the first three months of its decline, there is seldom much frost or cold in Bath previous to November.

“The absolute maximum temperature during the nine years has occurred four times in July, three times in August, and twice

in June. The absolute maximum has attained to  $90^{\circ}$  or upwards in only two years, 1868 and 1870,—in both instances, in the month of July,—the highest being  $90^{\circ}.5$  in 1868. There is no year in which it has not attained to  $83^{\circ}$  or upwards, the mean absolute highest for the whole period being  $87^{\circ}$ . In no year has the absolute maximum attained to  $70^{\circ}$  before the month of April, in which month a temperature of  $70^{\circ}$  or upwards has occurred in five different years. Nor has the same temperature been attained later in the year than October, in which month a temperature of  $70^{\circ}$  or upwards has occurred in three different years. The absolute maximum has never attained to  $60^{\circ}$  in either December or January, and has been as high as  $60^{\circ}$  or upwards only in one instance in November, and in one instance in February.

“The absolute minimum temperature during the nine years has occurred four times in December, three times in January, once in February, and once in March. There are only three years, viz. :—1866, 1868 and 1872, in which the absolute minimum has not fallen as low as  $20^{\circ}$ ; the lowest temperature reached being  $8^{\circ}.5$  in January, 1867. The mean absolute minimum for the whole period is  $17^{\circ}.3$ . The range of the absolute minimum during the nine years is  $15^{\circ}.7$ , extending from  $8^{\circ}.5$  to  $24^{\circ}.2$ . The months exempted from frost, or the months in which the absolute lowest has never fallen to  $32^{\circ}$ , are June, July, August and September. July is the only month in which the absolute lowest has uniformly kept above  $40^{\circ}$ . In June it has fallen below it in four instances, getting as low as  $37^{\circ}.2$  in June, 1872. In August it has fallen once below it, viz., in 1869, when it descended to  $37^{\circ}.3$ .

“The mean *monthly* range, or the mean difference between the absolute highest temperature and the absolute lowest temperature in each month, is least in February; the months of November, December, January, and March, showing no very marked difference among themselves in this respect, but the range in all is greater

than that of February—by three degrees or more. A considerable rise of the range occurs in April and May; in which months, scarcely different in this respect from each other, the mean monthly range attains its maximum. There is very little difference also in the three summer months of June, July, and August,—in none of which the range is much less than that of April and May. In the two autumnal months of September and October, the range is seen to decline further from the maximum; and in November the decline is still more marked, the range in this and in the other winter months being spoken of above.

“The mean *daily* range, or the mean difference between the highest temperature and the lowest temperature, in each twenty-four hours, rises gradually from a minimum in January to a maximum in July; then recedes, during the rest of the year, by steps nearly as gradual, till it reaches the minimum again. The chief circumstance noticeable is—that the greatest rise occurs in April; the daily range of temperature in which month is  $3^{\circ}4$  in excess of that of March. The rise is followed by a less one in May; the range during that month, and the three following summer months, being nearly the same.

“It is, however, the mean *daily* range of temperature, and not the mean *monthly* range, that is of most consequence in considering the conditions of a climate. It is quite natural, however, that both these ranges should be greatest in the warmer months and lowest in the winter. But, then, in these seasons the range is, for the most part, steady, varying but little; while it is the sudden rise or fall of the range, when the day temperature is suddenly raised much above what it had been a short time before—the night temperature remaining the same, or, perhaps, falling lower—of which persons are ordinarily most sensitive. And this irregularity will be found to occur in the spring. The cause, no doubt, is the prevalence of easterly winds, accompanied by a very dry state of the air at that season; rendering the nights very



cold, notwithstanding the great power of the sun during the day to heat the lower strata of the atmosphere. Hence it is that the spring season is so trying, not merely to certain classes of invalids, but sometimes even to healthy people. Bath certainly does not afford entire exemption from this evil.

“Next in importance to ascertaining the mean daily range of temperature, is the determination of the temperature of the several seasons at Bath, set down for each of ten years in the Table annexed :—

TABLE VI, *Mean Temperature of the Seasons for ten years, commencing with March, 1865, and ending with February, 1875. The three months of March, April, and May being considered as Spring; June, July, and August as Summer; September, October, and November as Autumn; December, January and February as Winter.*

|        | Spring. | Summer. | Autumn. | Winter. |
|--------|---------|---------|---------|---------|
| 1865   | 47.8    | 61.4    | 52.7    | 43.4    |
| 1866   | 47.8    | 60.1    | 51.9    | 42.7    |
| 1867   | 47.4    | 60.0    | 49.8    | 40.1    |
| 1868   | 50.5    | 63.5    | 50.2    | 46.3    |
| 1869   | 47.4    | 60.4    | 51.8    | 39.0    |
| 1870   | 48.1    | 62.3    | 49.7    | 38.1    |
| 1871   | 49.8    | 60.1    | 48.5    | 42.4    |
| 1872   | 49.2    | 61.3    | 52.0    | 41.1    |
| 1873   | 47.7    | 60.8    | 49.7    | 42.1    |
| 1874   | 50.5    | 61.7    | 52.2    | 38.9    |
| Means. | 48.6    | 61.1    | 50.8    | 41.4    |

"It will be noticed in the above Table that the mean temperature of each season varies considerably, and that it varies more in some seasons than in others. The range of the mean increases as the year advances ; being least in spring and greatest in winter. This leads to the inference that the winter season, at least in Bath, is of a more variable character as regards temperature than any of the other seasons.

"The mean temperature of spring varies from  $47^{\circ}.4$  to  $50^{\circ}.5$ , the range of the mean being  $3^{\circ}.1$ .

"The mean temperature of summer varies from  $60^{\circ}.0$  to  $63^{\circ}.5$ , the range of the mean being  $3^{\circ}.5$ .

"The mean temperature of autumn varies from  $48^{\circ}.5$  to  $52^{\circ}.7$ , the range of the mean being  $4^{\circ}.2$ .

"The mean temperature of winter varies from  $38^{\circ}.1$  to  $46^{\circ}.3$ , the range of the mean being  $8^{\circ}.2$ .

"In the above decade of years five summers were *above* the mean, viz., 1865, 1868, 1870, 1872 and 1874 ; and five were *below* the mean, viz., 1866, 1867, 1869, 1871 and 1873.

"The hottest summer was that of 1868, the temperature being  $2^{\circ}.4$  above the mean.

"The coldest summer was that of 1867, when the temperature was  $1^{\circ}.1$  below the mean.

"Of the winters also, five were *above* the mean, viz., 1865-6, 1866-7, 1868-9, 1871-2 and 1873-4 ; and five were *below* the mean, viz., 1867-8, 1869-70, 1870-1, 1872-3 and 1874-5.

"The mildest winter was that of 1868-9 (following the hottest summer), when the mean temperature rose to  $46^{\circ}.3$ , being  $4^{\circ}.9$  above the mean of the whole decade.

"The coldest winter was that of 1870-1, when the mean temperature fell to  $38^{\circ}.1$ , being  $3^{\circ}.3$  below the mean of the whole decade."

Mr. Blomefield compares these mean temperatures with those of other towns for the same decade of years, and then adds :

"It may be useful now, to sum up in a few words, the chief advantages which Bath enjoys above the other towns we have been comparing it with in each of the four seasons of the year.

"In spring Bath has a higher mean temperature, while the night temperatures are not so low, and the mean daily range is less, when compared with Greenwich and Royston especially.

"In summer the mean temperature is not different from that of the other towns, but the extreme night and day temperature are both of them more moderate; the mean daily range being still more contracted than in spring, in relation to those towns.

"In autumn the mean temperature is only very slightly higher than that of other places, the extreme day temperatures scarcely so high as some of them; but the nights are not so cold, the minimum not falling so low.

"In winter the mean temperature is decidedly higher; the extreme day and night temperatures are also both higher, though the mean daily range shows scarcely any difference."

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"There is always more or less *vapour* diffused through the atmosphere, though it varies much, not merely in quantity but in the mode of its distribution. The presence and the amount of this vapour have such a marked influence upon weather and climate, that it is quite of equal importance to determine its variations, as it is to determine the variations of atmospheric pressure and temperature. Persons frequently express their surprise at rain falling with a high barometer, or at the absence of rain with a low barometer. Or they see changes of weather taking place without either barometer or thermometer showing any particular sign; even the wind perhaps remaining in the same quarter as indicated by the vane. In these cases they overlook the important part played by vapour, with its own separate influence upon the weather.

“As considerations on the vaporous portion of our atmosphere serve to explain states of weather which would not be otherwise intelligible, so also do they assist us in forecasting the weather that is to be during the day. Whether it shall be wet or fine often depends upon the temperature and dew-point in their relations to each other,—upon the fall or rise of one of the two, the other, perhaps, remaining unchanged,—though sometimes, no doubt, the result, whichever it may be, is due to influences beyond the reach of our instruments.

“The same considerations help us also to explain another circumstance connected with weather phenomena ; and that is the occurrence of very unequal falls of rain at different times during changeable weather, without any proportionate difference in the temperature of the air, the temperature of the dew-point, or even in some cases the height of the barometer. Our meteorological instruments being ordinarily fixed at a very inconsiderable height above the ground, the indications of the wet-and dry-bulb thermometers relate of course only to that stratum of air in which they are placed. The barometer indeed tells us the whole weight of the atmospheric column above our heads ; but the height of the mercury is determined mainly by the weight of the air alone, the additional height due to the elasticity of the vapour contained in the air being comparatively small. Consequently, though there may be a large increase of vapour at any time, this would not show itself by its effect on the barometer to the same extent that an increase in the volume of the air itself would.

“The meteorological registers kept at the Literary Institution supply us with many instances serving to illustrate what has been said above ; and which clearly show how necessary it is to attend to the several agencies by which different states of weather are brought about in this changeable climate *collectively*, if we would thoroughly understand weather phenomena, as well as understand the working of our instruments by which we seek to explain those

phenomena. It is manifest, nevertheless, in some cases how complicated is the action of these two elements of weather—temperature and humidity—even at the level at which our instruments are fixed ; sometimes one and sometimes the other, by excess or defect, entirely altering the condition of the air ; sometimes both co-operating, either in opposite or in the same directions, to make the weather agreeable to our feelings or the reverse.

“And this leads to the question of climate and health, and the effect which the ever-varying conditions of the atmosphere have upon certain constitutions. Our sensations as affected by weather depend perhaps more upon the relative variations of heat and moisture than upon any other circumstances ; and these two are often quite different at the same place at different times. A month or a season may be very hot and very dry, or the humidity of the air may be great, with either a low or a high temperature. The exact influence of these changes upon the human frame doubtless depends much upon the health and temperament of each particular person. A state of weather that occasions no inconvenience to some persons may be highly prejudicial to others. Yet even the strongest are liable to feel the changes more or less.\* We almost all complain of the heat when the thermometer gets up to 80° or more ; and how much is our discomfort increased when this high temperature is combined with a high dew-point, such as usually occurs with a south or south-west wind ; the air being then especially what we call sultry, causing a feeling of lassitude, and indisposing to any exertion of body or mind.

“If, on the other hand, the temperature is low, whether in winter or summer, and the air dry with northerly winds, we do not think much about the cold, but rather feel braced for work

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\* It is said of Goethe, that “though his frame was strong and muscular,” and though “excelling in all active sports, he was almost a barometer in sensitiveness to atmospheric influences.”—*Lewes's Story of Goethe's Life*, p. 49.

and out-of-door exercise. If, however, in winter especially, without any rise of the temperature, the air after a time becomes loaded with moisture from the setting in above of a south-westerly wind, the current next the earth being still from the north, it is then to our feelings what we call *raw*, or both cold and damp, and more hurtful perhaps to persons in delicate health, if exposed to it, than any other ordinary weather.

“Now certain of these weather conditions may prevail to a greater degree in a particular locality than in other localities not very far off. Climate is often determined by local causes; by the nature of the soil,\* by proximity to the sea or large sheets of water, or by the configuration of the ground. Such agencies exercise an influence independent of the usual atmospheric changes, and are always operating to the advantage or disadvantage of a place as the case may be. Bath is an instance in which the climate is undeniably affected by the last of the above-mentioned causes, the hills that surround it on nearly every side giving it a more moderate temperature both in summer and winter. Yet it is under a disadvantage, so far as these same hills materially interrupt a free circulation of the air in hot weather, while the river along the valley is constantly exhaling vapour to increase its humidity.

“From this circumstance, the combined influence of temperature and humidity, in the case of the Bath climate, calls for especial consideration. And I have been led to say the more on this subject because, by those who have treated of the Bath climate hitherto, it has been very little attended to, if not entirely passed over.

“Let us now look more closely into the question of the

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\* The Earth, says Dr. Oliver, “that can impregnate Waters with such balsamic, healing, and agreeable ingredients as these Hot Waters have, may also send up into the air such benign effluvia or exhalations as may have a kind influence on our Constitutions, and be the cause of health.” Boyle thought that “in diverse places the salubrity or insalubrity of the air may be in a good part due to subterranean exhalations.”—J. K. S.

humidity of Bath, and see what light is thrown upon it by the observations in the garden of the Literary Institution as recorded in its daily registers.

“The following Table gives in four columns (1) the mean temperature of the dew-point, (2) the mean depression of the dew-point below the temperature of the air, (3) the mean elastic force of vapour, and (4) the mean degree of humidity, for each month, deduced from the observations of nine years 1866-1874.

|           | Mean<br>Temperature<br>of Dew-point. | Mean<br>Depression of<br>Dew-point. | Mean<br>Elastic force of<br>Vapour. | Mean<br>Humidity,<br>Saturation=100. |
|-----------|--------------------------------------|-------------------------------------|-------------------------------------|--------------------------------------|
|           |                                      |                                     | Inches.                             |                                      |
| January   | 37°.6                                | 3°.5                                | 0.232                               | 87                                   |
| February  | 39.1                                 | 3.5                                 | 0.243                               | 88                                   |
| March     | 38.3                                 | 3.9                                 | 0.236                               | 84                                   |
| April     | 43.7                                 | 6.2                                 | 0.289                               | 78                                   |
| May       | 44.2                                 | 8.7                                 | 0.305                               | 73                                   |
| June      | 52.4                                 | 6.2                                 | 0.397                               | 81                                   |
| July      | 56.1                                 | 7.0                                 | 0.450                               | 78                                   |
| August    | 55.5                                 | 6.2                                 | 0.447                               | 82                                   |
| September | 52.6                                 | 5.2                                 | 0.401                               | 82                                   |
| October   | 46.6                                 | 4.1                                 | 0.321                               | 87                                   |
| November  | 40.1                                 | 3.3                                 | 0.251                               | 89                                   |
| December  | 37.0                                 | 3.4                                 | 0.225                               | 89                                   |
| Means     | 45.3                                 | 5.1                                 | 0.316                               | 83                                   |

“The results given in the above table are not obtained by direct observation, but are deduced from daily observations of the dry and wet-bulb thermometer with the help of Glaisher’s ‘Hygrometrical Tables.’ There are other results relating to atmospheric vapour which might be obtained in the same way. But these seem sufficient for our present purpose. The point of chief interest is to ascertain the relative humidity of the air in the several months and seasons, or ‘the quantity of moisture present in relation to the quantity required to saturate the air at the existing temperature.’ It is the amount of vapour made sensible to us by condensation ; vapour, previous to condensation, being perfectly dry as well as transparent, and exerting no influence upon our feelings.

“The *relative humidity*, therefore, must not be confounded with the *absolute* amount of vapour present in the atmosphere, or—as it has been sometimes called—the *absolute humidity*, which varies very differently from the former, and is often least when the relative humidity is greatest, and *vice versa*. The absolute amount of vapour depends upon temperature, the air having an increased capacity for aqueous vapour as the temperature increases. Hence in summer the amount is much larger than in winter, whereas in the case of the relative humidity it is just the reverse. Here the maximum is in winter. For though the sun at this season, from its reduced evaporating power, raises but little vapour from the earth’s surface, the air nevertheless is extremely humid from increased condensation due to cold.

“In proportion to the temperature also will be the elasticity of the atmospheric vapour, or its power to sustain more or less of the mercurial column. This elastic force is given for each month in the third column of the above table, and to a certain extent the *absolute* amount of vapour is represented by it. And it will be seen, agreeably to what is above stated, how this quantity increases as the year advances, attaining its maximum in the



summer months of July and August ; it then gradually declines till it gets to a minimum in December and January.

“The *relative* humidity is partly indicated in the second column of the same table by the mean depression of the dew-point below the temperature of the air ; this depression increasing with the dryness of the atmosphere, and therefore usually greatest in spring and summer, though varying from month to month according to the weather. The relative humidity, however, is more exactly given in the fourth column, where ‘saturation is assumed as 100, and perfectly dry air as zero.’ The higher the figures, therefore, in that column, the more nearly the humidity of the air approaches to complete saturation.

“Confining ourselves then to this last column, November and December are seen to be the *most humid* months in Bath, then January and February, comprising together the latter part of autumn and the whole season of winter. In spring the humidity lessens considerably ; falling in March much below the humidity of February, falling still more in April, and yet lower in May, when it reaches the minimum. In summer it again increases, in autumn still more so, till it returns to its maximum in the two last months of the year as already stated.

“But, as in the case of temperature, it is in reference to other towns compared with Bath that the subject of the humidity of the Bath climate acquires its chief interest.”

Mr. Blomefield compares the humidity of two groups of towns—respectively eastward and westward—with that of Bath, and continues :—“The upshot of the whole comparison seems to be that Bath, in relation to other towns whether eastward or westward, is characterised by an excess of humidity during summer and autumn, but by a deficiency of the same, compared with a few other places, in winter and spring.

“Looking to Bath alone, the humidity appears to be considerable at all periods of the year ; the amount being nearly the same in

spring and summer, increasing in autumn, and greatest in winter, —though it is in summer, when combined with a high temperature, that its effects would be most felt.”

The author makes some observations on Fogs in Bath, and thus speaks of *Rain* :—

*Rainfall in each month in each year of the Decade, commencing with March, 1865, and terminating with February, 1875.\**

|                | Jan.    | Feb.    | March.  | April.  | May.    | June.   | July.   | Aug.    | Sep.    | Oct.    | Nov.    | Dec.    | Yearly Totals. |
|----------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|----------------|
|                | Inches. | Inches. | Inches. | Inches. | Inches. | Inches. | Inches. | Inches. | Inches. | Inches. | Inches. | Inches. | Inches.        |
| 1865           | —       | —       | 1.049   | 0.967   | 2.049   | 1.370   | 3.356   | 4.771   | 0.036   | 5.566   | 3.804   | 2.747   | 25.715         |
| 1866           | 5.374   | 4.365   | 1.964   | 1.743   | 1.050   | 3.103   | 2.064   | 2.554   | 6.734   | 1.546   | 2.209   | 3.172   | 35.878         |
| 1867           | 4.073   | 2.564   | 3.968   | 3.051   | 1.955   | 1.376   | 3.093   | 2.059   | 1.837   | 3.551   | 0.913   | 1.416   | 29.856         |
| 1868           | 4.956   | 1.689   | 1.583   | 2.364   | 0.701   | 0.532   | 0.542   | 4.342   | 3.232   | 2.635   | 1.891   | 5.479   | 29.946         |
| 1869           | 5.068   | 2.841   | 1.418   | 0.932   | 4.704   | 1.409   | 1.057   | 1.070   | 4.344   | 1.987   | 2.464   | 3.781   | 31.075         |
| 1870           | 2.425   | 1.882   | 1.189   | 0.423   | 2.027   | 0.757   | 0.610   | 1.225   | 1.258   | 5.427   | 2.164   | 1.595   | 20.982         |
| 1871           | 2.325   | 1.335   | 1.329   | 3.509   | 1.095   | 1.901   | 5.055   | 1.131   | 6.794   | 1.546   | 0.700   | 1.920   | 27.640         |
| 1872           | 5.204   | 3.109   | 2.040   | 2.692   | 2.023   | 3.166   | 2.202   | 1.544   | 3.001   | 3.714   | 4.144   | 4.729   | 37.568         |
| 1873           | 4.408   | 1.230   | 3.521   | 0.654   | 1.722   | 0.931   | 2.621   | 3.012   | 1.285   | 2.286   | 2.556   | 0.564   | 24.890         |
| 1874           | 3.075   | 2.185   | 1.162   | 1.569   | 0.479   | 1.073   | 0.910   | 3.445   | 6.426   | 3.766   | 2.021   | 3.549   | 29.660         |
| 1875           | 4.200   | 2.455   | —       | —       | —       | —       | —       | —       | —       | —       | —       | —       | 6.655          |
| Monthly Means. | 4.110   | 2.365   | 1.922   | 1.790   | 1.780   | 1.561   | 2.151   | 2.515   | 3.394   | 3.202   | 3.549   | 2.895   | 29.986         |

\* Though the whole period amounts to ten years, of course the measurements under the head of yearly totals, in the cases of 1865 and 1875, have no significance separately considered, but must be added together to make up the tenth year.

“The mean yearly rain-fall at Bath, determined by the results given in the above Table, is 29.986 inches. Allowing for errors, it might probably be set at 30 inches at least if not more. The wettest year in the decade was 1872, when the fall amounted to 37.568 inches. The driest year was 1870, when the fall was only 20.982 inches, the difference between the two falls amounting to 16.586 inches.

“From estimating the mean yearly rain-fall at Bath, we may pass to that of each of the seasons, as well as that of the several months relatively considered. The former is as follows :—

|                       |       |         |
|-----------------------|-------|---------|
| Mean Spring Rain-fall | 5.492 | inches. |
| Mean Summer Ditto     | 6.227 | „       |
| Mean Autumn Ditto     | 8.892 | „       |
| Mean Winter Ditto     | 9.370 | „       |

“From this it appears that the rain-fall is least in spring, the fall increasing in summer, with a further increase in autumn, and greatest in winter.

“With regard to the several months, the mean monthly fall is greatest in January. This month was absolutely the wettest in four years out of the ten, viz., in 1867, 1869, 1872, and 1873. Also in 1866, though the September fall in that year exceeded the January fall, the latter still amounted to nearly  $5\frac{1}{2}$  inches; and again in 1868, though the December fall exceeded that of January, the latter still had very nearly 5 inches. The driest period of the year at Bath appears on an average to be from March to June, both months inclusive. In no one of these four months does the mean rain-fall amount to 2 inches,—the least fall occurring in June. The greatest rain-fall in any single month during the decade was 6.734 inches. This was in September, 1866, when rain more or less fell every day in the month except one. The least rain-fall in any single month was 0.036 inches in September, 1865; there being no single month in the decade absolutely without rain. It

may be noticed, though probably a mere accident, that the greatest and least falls both occurred in September. There are one or two features in the rain-fall of June and July deserving mention. The average fall for these two months combined is 3.712 inches. Whenever the combined fall is in excess of the average, the greater part of the fall is found in the Table to occur in *one* of those two months, and generally in July, instead of both months being equally wet. When the combined rain-fall is below the average, it appears to be pretty equally divided between the two months. There is an exception to this last rule in the year 1873, when the fall in July was more than an inch and a half in excess of the June fall; but then the whole fall was only a very little below the mean.

“Passing on to the average autumnal rain-fall at Bath, it is observable that the greater part of the rain at this season falls in the first two months; September having the highest average, October the next highest, and November the lowest average.

“There is not much difference between the averages of September and October, but it is worth noting that in most of the years there was a great excess of rain in *one* of these two months above what fell in the other. But when we inquire in which of the two months, September or October, this excess of rain usually takes place,—we find it equally divided between the two; there being in the decade exactly five years in which September had the excess, and five in which October had it. The conclusion seems to be that, on an average, one of the two months of September and October is, comparatively speaking, a wet one, and the other a dry one. But which is to be wet and which dry is an even chance looking merely to returns.

“The average number of wet days in Bath, or days on which rain falls to the amount of not less than one hundredth of an inch, is shown by statistics to be about 161. If we included the days on which the amount is too small to be measured, it would

certainly exceed one-half the number of days in the year.\* It must be remembered, however, that a day of twenty-four hours is here meant, and that much of the rain falls during the night ;—the fine days, therefore, as ordinarily estimated, would amount to many more than the above calculation gives. The greatest number of days on which rain fell in any one year (from 1865-75) was 210, in 1872. The least number of days in any one year was 113, in 1870. The month with the highest average number of rainy days is January, the number being nineteen. The month with the lowest average number is June, the number being 8.9. Generally the heaviest fall of rain occurs in the summer months, in the form of storms and hard showers, which, comparatively speaking, are not of long duration. In the winter, the rains are more frequent and more continuous, and they fall more equably.”†

After a comparison of the rain-fall in other parts of England with that in Bath, Mr. Blomefield compares the observations of meteorologists at Weston, Upper Swanswick, and other places in the vicinity ; and arrives at the conclusion that “irrespective of any difference in the *quality* of the air, the hills are most to be recommended for summer residence, the high temperatures at that season not being greater, or indeed very different from what

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\* Howard says that “in our climate, on an average of years, it rains nearly every other day more or less.”—*Climate of London*.

† In the “*Rambles about Bath*” is the following passage (p. 460) :—“The latest Blue Book published by the Rivers’ Pollution Commissioners, on the Domestic Water Supply of Great Britain, contains a Map of the Country by which the rain-fall of any given district may be seen at a glance. It is shown that Bath enjoys, in common with the West and Midland Counties, a moderate and sufficient supply of from 25 to 30 inches yearly. This quantity increases rapidly as we go westward ; Bristol having a rain-fall of from 30 to 40 inches, which increases in Cornwall to from 40 to 50 inches, the higher parts of the country ranging from 53 to 75 inches.” Mr. Ekin has favoured me with an inspection of the Map above mentioned.—J. K. S.

they are in the town, while the mean temperature is less ; but that the town is to be preferred in winter as both warmer and drier at that period of the year, with a more limited range of temperature,—the night temperatures especially not falling so low as on the hills, a matter of considerable importance to certain classes of invalids.

“This may,” he says, “have been often assumed to be the case before ; but I do not believe it has ever been put to the proof, or shown to be sustained by the results of any comparative observations, made contemporaneously in the town and on the hills above.”

In a chapter on *Winds*, Mr. Blomefield says :—“Distributing the winds under the four heads of N.—E., E.—S., S.—W., and W.—N., the first of these classes embracing the winds from N. and N.E., but not those due E. ; the second in like manner E. and S.E., but not those due S. ; the third S. and S.W. ; the fourth W. and N.W. ; it appears that by far the most prevalent winds in Bath are those from the W.—N. quarter, those next in frequency being the S.—W., then the N.—E., and the less frequent those from E.—S. The N. and N.E. winds in Bath, as in most other places in England, attain a maximum in spring, and are least prevalent in winter. The S. and S.W., on the contrary, attain a maximum in winter, and are least prevalent in spring. This is quite in accordance with the circumstance of the winter being the wettest season, and the spring the driest season, in Bath, as before shown, our chief rains coming from the S.W. The W. and N.W. winds are those that mainly characterise the summer months, while in every season except winter they predominate over all the others. S.E. winds are chiefly attendant upon weather in a transitional state, and seldom continue long, though more frequent in spring than at other times of the year.

“These results, with regard to the winds in Bath, are not very different from what I obtained in Cambridgeshire, after tabulating

them there for nineteen years; and the same order probably prevails over a large part of the southern half of England. Yet, from local conditions of the atmosphere, they may vary in character in different places, and in their effect upon the human frame. Thus the N.E. winds in Bath do not come up to the severity of those winds in the eastern counties, from the circumstance of Bath having a higher mean temperature, with higher temperature at night, in the season in which those winds chiefly prevail. Bath is also to a certain extent sheltered from the full force of the easterly winds by the surrounding hills, as has been remarked both by Dr. Granville and Dr. Tunstall in their respective works, to which I would refer those who desire further details on this part of the subject. At the same time, from the great irregularity of the ground, winds, except the westerly, when blowing strong, are here and there deflected from their right path, causing eddies and cross-currents in certain parts of the town, which make it difficult to say in some cases from what quarter the wind really blows."

After some remarks on the Quality of the Air,\* Mr. Blomefield concludes :—"As there is a 'season' in Bath, and times of the year when the place is more resorted to than others, by invalids especially, these meteorological questions are not without a local

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\* Mr. Blomefield makes some interesting remarks on Ozone; and in a book recently written by Mr. Hartley, F.C.S., entitled "Air, and its Relations to Life," I find the following summary of M. Houzeau's researches. (1) The amount of Ozone in the air at different times and in different places is variable, the maximum being one volume in 700,000 of air. (2) Ozone is found much more frequently in the country than in the town. (3) Ozone is in the greatest quantity in the spring, is less in summer, diminishes in autumn, and is least in winter. (4) Ozone is most often detected on rainy days and during great atmospheric disturbances. (5) Atmospheric electricity is apparently the great generator of Ozone. Professor Odling proved that three volumes of Oxygen become condensed by electrification to two volumes of Ozone. - J. K. S.



interest. It is much to be desired also, in reference to the whole subject of the climate of Bath, that observations on the temperature, dew-point, rain, &c., should continue to be made in the Institution Garden as hitherto.

“At the end of another ten years there will be occasion to have them again reduced as now, and made available for comparison with the results put together in this paper. And should additional registers be kept in other places in Bath or in the immediate neighbourhood, as it is hoped may be the case—more especially if some open spot on the level of the Royal Crescent, of intermediate elevation between the lower and higher parts of the town, could be obtained for the erection of a meteorological observatory, as suggested in my address to this Club in 1872,—and the whole together be carefully examined and compared in their several results with what I have attempted to bring out in the present instance, we should then be able to fix with greater precision than can be attained after only a few years’ observations and in one station alone the true character of the Bath climate, a matter of so much importance to residents as well as visitors, especially to those who resort to it on the score of health. But I can never hope to undertake any further investigation of the subject myself. I leave it to those who come after me.”



THE  
BATH THERMAL WATERS,  
UNDER THE  
MANAGEMENT OF THE CORPORATION.  

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THE WATER for BATHING and DRINKING is supplied direct from the MINERAL SPRING. The natural temperature of which is from 117° to 120°, and when used for Bathing it is reduced to the required heat by the addition of cooled Mineral Water. Tickets must in all cases be procured at the Ticket Office, adjoining the Grand Pump Room Hotel, previous to Bathing, and Bathers are requested to see that their tickets are clipped by the attendant to whom they are delivered.

### CHARGES FOR BATHS.

AT THE NEW ROYAL BATHS (*Grand Hotel*).

|  | s. | d. |
|--|----|----|
| First-Class Private Baths ... ..             | 2  | 6  |
| Ditto with Douche ... ..                     | 3  | 0  |
| Vapour Bath ... ..                           | 2  | 6  |
| Ditto with Shower ... ..                     | 3  | 6  |
| Reclining and Douche ... ..                  | 2  | 0  |
| A Child under 12 Bathing with its Parent ... | 1  | 0  |

Two Children under 12 using the same Bath  
pay as one Adult. Attendant's Fee, 3d.

*Attached to these Baths is a First-Class Swimming Bath daily  
supplied with fresh water for Ladies' use on Monday,  
Wednesday and Friday.*

|  |   |   |
|--|---|---|
| With the use of Private Room, for One Person ... | 1 | 0 |
| " " " " Two Persons ...                          | 1 | 6 |
| " " " " Three Persons ...                        | 2 | 0 |

Fee, 1d.

*This Bath is available for Gentlemen on Tuesday, Thursday and  
Saturday at a charge of 1s. each Person, and Attendant's Fee, 1d.*

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## KING'S AND QUEEN'S BATHS (*Stall Street*).

|                          |     |     | s. | d. |
|--------------------------|-----|-----|----|----|
| First-Class Private Bath | ... | ..  | 2  | 0  |
| Ditto with Douche        | ... | ... | 2  | 6  |
| Vapour Bath              | ... | ... | 2  | 0  |
| Ditto with Shower        | ... | ... | 2  | 6  |
| Reclining Bath           | ... | ... | 1  | 6  |
| Ditto with Douche        | ... | ..  | 2  | 0  |

## SECOND-CLASS BATHS.

|                |     |     |   |   |
|----------------|-----|-----|---|---|
| Reclining Bath | ... | ... | 1 | 6 |
| Ditto ditto    | ... | ... | 0 | 6 |
| Public Bath    | ... | ..  | 1 | 0 |
| Ditto ditto    | ... | ... | 0 | 6 |

Fees to Attendants, 1d., 2d., 3d.

## ROYAL BATHS (*Hot Bath Street*).

|                          |     |     |   |   |
|--------------------------|-----|-----|---|---|
| First-Class Private Bath | ... | ... | 2 | 0 |
| Ditto with Douche        | ... | ... | 2 | 6 |
| Second ditto ditto       | ... | ... | 1 | 6 |
| Reclining Bath           | ... | ... | 1 | 6 |
| Shower Bath              | ... | ... | 1 | 6 |

Fees to Attendants, 2d. and 3d.

## TEPID SWIMMING BATHS (FOR GENTLEMEN ONLY).

|                          |     |     |   |   |
|--------------------------|-----|-----|---|---|
| With use of Private Room | ... | ... | 0 | 9 |
| Ditto Public Room        | ... | ... | 0 | 6 |

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## CROSS BATH (*St. Michael's Place*).

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|-----------------------------|-----|-----|---|---|
| Open Public Bath, Admission | ... | ... | 0 | 2 |
| Ditto with Towel            | ..  | ... | 0 | 3 |

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The Grand Pump Room is open each week-day from 8.30 till 4.30, and on Sundays before and after Morning Service.

Charges—Single Glass, 2d.

|                   |     |     |     | £   | s. | d.   |
|-------------------|-----|-----|-----|-----|----|------|
| Per Week          | ... | ... | ... | ... | 0  | 1 6  |
| Per Month         | ... | ... | ... | ... | 0  | 5 0  |
| Per Three Months  | ... | ... | ... | ... | 0  | 10 0 |
| Per Six Months    | ... | ... | ... | ... | 0  | 15 0 |
| Per Twelve Months | ... | ... | ... | ... | 1  | 0 0  |
| For a Family      | ... | ... | ... | ... | 2  | 0 0  |

At the Hetling Pump Room the charge is 1s. per Week,  
or 2d. per Glass.

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